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URBAN MASS TRANSPORTATION ADMINISTRATION

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UMTA-SPONSORED REPORTS AVAILABLE AT THE NATIONAL TECHNICAL INFORMATION SERVICE

CONVENTIONAL TRANSIT SERVICE/INNOVATIONS AND IMPROVEMENTS

Application of Transit Performance Indicators
Final Report

Thomas J. Stone, et al., University of Utah/Civil Engineering Department. UMTA-UT-11-0001-79-1, September 1979, 282p

Decreasing transit ridership and increasing operating and capital costs have resulted in a situation whereby the Urban Mass Transportation Administration (UMTA) is requiring transit operators to develop comprehensive data reporting schemes. Transit operators are realizing the need for measurement of transit system productivity, efficiency, and effectiveness, in order to make decisions on where to add, modify, or delete service. This research provides an internal route-specific, performance monitoring tool, but does not address the issue of measurement of system-wide performance. The project is aimed solely at bus transit monitoring. The research was devised to yield a specific product, which is a comprehensive decision framework for applying transit performance indicators. Two performance indicators were selected for use in the research, namely, passengers per bus mile and passengers per bus hour. The decision framework is based upon the statistical decision-making techniques which are used in other fields such as quality control. Two case studies were used in this framework to apply indicators to the measurement of performance of the bus transit systems of the Regional Transportation District of Denver, Colorado and the Utah Transit Authority of the Salt Lake City, Utah region. Guidelines are given to assist transit operator programs. Included is a comparison of these route-specific data requirements in UMTA's Section 15 ridership reporting requirements.

NTIS No. PB 80-121569 Price A13

Automated Mixed Traffic Vehicle Study at Washington National Airport

Cady C. Chung, The Mitre Corporation/Metrek Division. UMTA-VA-06-0056-79-1, November 1979, 72p

Passenger-carrying Automated Mixed Traffic Vehicles (AMTV) development has recently demonstrated successful automated vehicle operation in both pedestrian and limited automobile traffic. Passenger-carrying AMTV's are intended to provide the advantages of automation to that segment of the transit market that handles a moderate demand level over short distances at low speeds. This study examines the site and passenger demand characteristics at Washington National Airport and analyzes the application feasibility of providing AMTV service between the air terminals and the long term and satellite parking lots. The AMTV system analyzed within this report includes three separate routes; all of which use 8-passenger AMTV vehicles. The system includes a single lane loop, a single lane shuttle, and a double lane route. Route fleet size requirements range from one to four vehicles. On a route-by-route basis, the AMTV routes studied compare favorably with several other alternative modes in terms of both level of service and costs. Although the AMTV has higher capital costs than the existing shuttle

bus system and the upgraded exclusive right-of-way bus system, the AMTV offers 54 significant savings in annual and O&M costs. Other related reports are: "Automated Mixed Traffic Vehicle (AMTV) Technology and Safety Study" (N78-25257) and "Automated Mixed Traffic Vehicle Control and Scheduling Study" (PB 264-527).

NTIS No. PB 80-121148 Price A04

Increasing Transit's Share of the Regional Shopping Center Travel Market: An Initial Investigation
University Research

J. B. Schneider, et al., University of Washington/Departments of Civil Engineering and Urban Planning. UMTA-WA-11-0006-80-1, August 1979, 229p

This report examines the explosive growth of the shopping center during the last 23 years as well as factors influencing travel to large regional malls, and the current trends that will affect malls in the future. The focus of this report is on large shopping malls ranging in size from 800,000 to 2,000,000 square feet of gross leasable area; having 4,000 to 15,000 auto parking spaces; and located 6 to 20 miles from "downtown" of the central city. The objectives of this study are to: 1) examine current approaches to providing transit service to these malls, and 2) develop recommendations for gaining a larger share of this travel market for public transit. The results of 27 case studies in 18 U.S and one Canadian city are presented. They describe what transit service is being provided, and how and why it is being used or ignored at these 27 regional malls. The case studies were written primarily for transit operators and should be of interest to urban planners, traffic engineers, mall developers and operators, architects, and both transit system and retailer marketing people. The report states that in order to achieve the objectives, private and public sector cooperation is needed as well as experimentation with innovative transit provision techniques, development of improved analysis and planning methods, and basic data gathering efforts.

NTIS No. PB 80-131360 Price A11

Low-Floor Articulated Bus Demonstration
Final Report

Transportation Consulting Division, Booz, Allen & Hamilton, Inc. UMTA-MD-06-0024-79-1, September 1979, 45p

This report is documentation of a program to demonstrate the stability and anti-jackknifing capabilities of a low-floor articulated bus to the transit industry. This demonstration intended to show that a high passenger capacity Transbus configuration could be developed embodying the low-floor concept by incorporating anti-jackknifing capabilities in the design and thus, maintain coach stability. For the demonstration program a prototype coach built by the firm of Hamburg-Consult of the Federal Republic of West Germany was demonstrated and evaluated at five sites in the United States: the U.S. Department of Transportation in Washington, D.C.; the Southeastern Michigan Transportation Authority in Detroit, Michigan; the Port Authority of Allegheny County in Pittsburgh, Pennsylvania; and the Mass Transit Administration of Maryland in Baltimore, Maryland. Additional testing and evaluation was conducted at the Transportation Research Center of Ohio in East Liberty, Ohio. The demonstration showed that the low-floor concept, seen in the prototype, is an improvement over current articulated vehicle designs. The low floor allows faster and easier boarding, thus increasing productivity, and offering an advantage to elderly and handicapped persons. The performance and the industry's favorable reaction to

the technology at all five sites is evidence of the prototype's demonstrated stability and anti-jackknifing capabilities of a low-floor articulated bus.
NTIS No. PB 300-497 Price A03

Service and Methods Demonstration Program
Annual Report

Bruce D. Spear, et al., U.S. Department of Transportation/Research and Special Programs Administration. UMTA-MA-06-0049-79-8, August 1979, 314p

The Urban Mass Transportation Administration (UMTA) Service and Methods Demonstration (SMD) Program was established in 1974 to provide a consistent and comprehensive framework within which innovative transportation management techniques and transit services could be developed, demonstrated and evaluated, and the resultant findings disseminated in a timely manner to transportation planners, policy makers, and transit operators. The program focuses on strategies that involve the imaginative use of traffic management, pricing and marketing techniques, transit service variations, and existing technology to produce improvements which require relatively low levels of capital investment, and which can be implemented within a short time frame. This report documents the SMD program for Fiscal Year 1978. Program activities and accomplishments are reviewed for each of the following areas: conventional transit service improvements; pricing and service innovation; paratransit; transportation services for special user groups; evaluation methodology; and information dissemination. Results of current demonstration projects and special studies of innovative service concepts are summarized. Where appropriate, transferable findings are reported, and current gaps in knowledge of these concepts are identified. Future projects aimed at obtaining additional information and experience in order to arrive at more conclusive understanding of the applicability and potential for these innovative transportation services are also described. Earlier SMD Program Annual Reports are: November 1975 (PB 251-325); 1976 (PB 270-673); Fiscal Year 1977 (PB 292-008); and Executive Summary, August 1979 (PB 80-106222).
NTIS No. PB 80-110281 Price A14

Service and Methods Demonstration Program
Annual Report
Executive Summary

Bruce D. Spear, et al., U.S. Department of Transportation/Research and Special Programs Administration. UMTA-MA-06-0049-79-7, August 1979, 43p

This Executive Summary contains a summary of the contents of the Service and Methods Demonstration Program Annual Report for Fiscal Year 1978. Program activites and accomplishments discussed in the Annual Report are reviewed, including findings and insights from current demonstration projects, descriptions of future projects, and support activities in the areas of evaluation methodology and information dissemination. The objectives of the SMD program are to: 1) provide more efficient and effective public transportation service; 2) bring about the use of local regulatory and pricing authority to encourage ridesharing and transit use; 3) develope a mix of innovative transit service models that appeal to a wide range of user groups; 4) integrate the use of private and public providers into a comprehensive set of public transportation services; 5) develope information to assist local, state, and Federal policy formulation; and 6) guide an improved level of local responses to UMTA regulations concerning Transportation Systems Management (TSM), elderly and handicapped, and Alternatives Analysis.
NTIS No. PB 80-106222 Price A03

The Westport Connecticut Integrated Transit System
Final Report

Robert E. Furniss, CACI, Inc. - Federal. UMTA-CT-06-0007-79-1, July 1979, 211p

The Westport Integrated Transit Service Demonstration was initiated in April 1977. The purpose was to demonstrate the feasibility of combining shared-ride taxi and other paratransit service with conventional fixed-route bus service in Westport, Connecticut. The project focused on the Westport Transit District (WTD) playing a major brokerage role which involved contracting with private operators for the provision of shared-ride service. This report is an evaluation of the Westport Demonstration implementation, operations, and impacts, and covers a six month planning period and two full years service operations. The planned and actual project implementation is described, including important Federal litigation initiated against the project by one of the two local taxi operators. The report also describes the integrated fleet management and vehicle deployment strategies utilized by the WTD to provide regular fixed-route, supplemental fixed-route, shared-ride taxi, and special markets services. Arrangements for system integration in the areas of maintenance, marketing, public information, and fare structure are also discussed. The evaluation examines ridership markets, system productivity, service economics, and community impacts. The author states that the Westport Demonstration has important implications for other communities considering the implementation of integrated transit services.

NTIS No. PB 80-129877 Price A10

FARES/PRICING AND SERVICE INNOVATIONS

Development of a Time-Calibrated, Self-Cancelling Ticket
Final Report

J. P. Tratnyek, et al., Arthur D. Little, Inc. UMTA-IT-06-0125-79-1, May 1979, 75p

A time-calibrated, self-cancelling ticket has been proposed as a simple device that could be used by the Department of Transportation as an option in implementing congestion-pricing demonstration projects. Such a ticket is a disposable device that measures a predetermined time and then indicates expiration by color change. In an earlier report, "Development of a Time-Calibrated, Self-Cancelling Ticket Initial Feasibility Determination" (PB 289-133), a basic time-calibrated, self-cancelling ticket based on an electrochemical approach resulted. It was considered too complex and its development was discontinued. Instead the program was directed toward developing a time-calibrated, self-cancelling ticket based upon chemical principles. This report describes the second phase of the program. It discusses several approaches to a ticket that is required to operate from -18,C to 66,C with 100% reliability and to show expiration no sooner than 4 hours and no later than 20. Several models of this ticket have been prepared. The authors state that this current working ticket represents a major achievement in the state of the art.

NTIS No. PB 80-117609 Price A04

Self-Service Fare Collection
Volume I: Review and Summary

Lawrence Deibel, et al., The MITRE Corporation/Metrek Division. UMTA-VA-06-0049-79-2, August 1979, 91p

Interest in the European system of fare collection for urban transit, broadly known as Self-Service Fare Collection (SSFC) has been growing in the United States. The European experience indicates that SSFC promotes greater operating efficiency and improved service delivery. The common features of SSFC, which are self-monitoring; fare payment; receipts; ticket inspection and penalties, represent

substantial departures from the current operating procedures and existing legal powers of U.S. transit systems. This 4-volume study discusses the European SSFC system and the relative merits of the alternative approaches to self-service with respect to their application in the United States. This volume, Volume I, describes the European approach to and rationale for self-service fare collection; documents the experience European transit systems have had with using and enforcing these procedures; and discusses the relative merits of the alternative approaches to self-service with respect to their application in the United States.

NTIS No. PB 80-132251 Price A05
PB 80-132244/SET OF 4 E13

Self-Service Fare Collection
Volume II: Survey of European Transit Properties

Lester R. Strickland, The MITRE Corporation/Metrek Division. UMTA-VA-06-0049-79-3, August 1979, 183p

This volume, Volume II, summarizes the information obtained from eleven European transit properties and one Canadian property.

NTIS No. PB 80-132269 Price A09
PB 80-132244/SET OF 4 E13

Self-Service Fare Collection
Volume III: Hardware Considerations

Lawrence E. Deibel, The MITRE Corporation/Metrek Division. UMTA-VA-06-0049-79-4, September 1979, 78p

This volume, Volume III, describes the equipment commonly used to support self-service operations in Europe and discusses the policy and design options which are presented during the selection and specification of equipment for self-service operations.

NTIS No. PB 80-132277 Price A05
PB 80-132244/SET OF 4 E13

Self-Service Fare Collection
Volume IV: Legal and Labor Issues

Gloria G. Eiseman, The MITRE Corporation/Metrek Division. UMTA-VA-06-0049-79-5, August 1979, 59p

This volume, Volume IV, summarizes the legal issues of self-service operations in the United States transit environment and also addresses labor, economic, liability, and accessibility issues of self-service in U.S. applications.

NTIS No. PB 80-132285 Price A04
PB 80-132244/SET of 4 E13

PARATRANSIT SYSTEMS AND SERVICES

Benefit-Cost Analysis of Integrated Paratransit Systems
Volume I: Executive Summary

M. Flusberg, et al., Multisystems, Inc. UMTA-MA-06-0054-79-5, September 1979, 73p

Integrated Paratransit (IT) service is a concept which involves the integration of conventional fixed-route transit services with flexible, demand-responsive services in order to best serve emerging urban development patterns. This study systematically estimates potential impacts of a range of integrated transit/paratransit options and policies in a variety of settings and compares them with impacts of transportation alternatives. This study concludes that, in general, IP with fares closer to fixed-route transit than exclusive-ride taxi will result in net paratransit operating deficits. However, in some instances, the benefits of IP

options in terms of improved service levels and mobility, reduced auto expenditures and other impacts appear to offset these operating deficits. IP was found to have a positive but insignificant impact in reducing automobile usage and ownership, but no measurable impact on vehicle miles traveled, fuel consumption, or emissions. The most promising paratransit concepts appear to be checkpoint many-to-many service, route deviation service, automated doorstop service with high vehicle densities, and vanpool service. The results of the study further suggest that paratransit service is sensitive to fare. The study also concluded that digital communications and automated dispatching systems are potentially cost-effective technological innovations. This report, Volume I, is the first of six volumes documenting this study, and is intended to serve as a summary of the entire study.

NTIS No. PB 80-125479 Price A04
PB 80-125461/SET OF 6 E19

Benefit-Cost Analysis of Integrated Paratransit Systems
Volume II: Introduction and Framework for Analysis

M. Flusberg, et al., Multisystems, Inc. UMTA-MA-06-0054-79-6, September 1979, 77p

This volume, Volume II, describes the overall approach and analysis framework.

NTIS No. PB 80-125487 Price A05
PB 80-125461/SET OF 6 E19

Benefit-Cost Analysis of Integrated Paratransit Systems
Volume III: Scenario Analyses

M. Flusberg, et al., Multisystems, Inc. UMTA-MA-06-0054-79-7, September 1979, 358p

This volume, Volume III, describes the scenario analyses of the integrated paratransit options and alternatives and provides the resulting conclusions.

NTIS No. PB 80-125495 Price A16
PB 80-125461/SET OF 6 E19

Benefit-Cost Analysis of Integrated Paratransit Systems
Volume IV: Issues in Community Acceptance and IP Implementation

M. Flusberg, et al., Multisystems, Inc. UMTA-MA-06-0054-79-8, September 1979, 122p

This volume, Volume IV, contains analyses of factors influencing community acceptance of integrated paratransit systems.

NTIS No. PB 80-125503 Price A06
PB 80-125461/SET OF 6 E19

Benefit-Cost Analysis of Integrated Paratransit Systems
Volume V: The Impacts of Technological Innovation

M. Flusberg, et al., Multisystems, Inc. UMTA-MA-06-0054-79-9, September 1979, 78p

This volume, Volume V, contains the analysis of the impacts of technological innovations on integrated paratransit systems.

NTIS No. PB 80-125511 Price A05
PB 80-125461/SET OF 6 E19

Benefit-Cost Analysis of Integrated Paratransit Systems
Volume 6: Technical Appendices

M. Flusberg, et al., Multisystems, Inc. UMTA-MA-06-0054-79-10, September 1979, 137p

This volume, Volume VI, includes five technical appendices which document the

methodologies used in the benefit-cost analysis.
NTIS No. PB 80-125529 Price A07
PB 80-125461/SET OF 6 E19

Vanpool Research: State-of-the Art Review
Final Report
John H. Suhrbier and Frederick A. Wagner, Cambridge Systematics, Inc. UMTA-MA-06-0049-79-5, April 1979, 117p
A wide dichotomy of viewpoints currently exist regarding the growth of employer-based, third-party, and owner-operator vanpool programs. The purpose of this report is to identify existing vanpool research activities of Federal, state, and local governments, private organizations, and universities; to assess the current state of knowledge, based on this research, of vanpool operating characteristics, institutional issues, and ridership; to determine areas where additional vanpool research may be needed; and to provide guidance in future vanpool-related demonstration projects. The authors state that although the assessment of vanpooling that emerges from both a review of available material and discussions with those active in the field is mixed, an examination of available vanpool information indicates a lack of reliable and objective evaluation data on the relative costs and effectiveness of different vanpooling arrangements. The appendix within the report, University Vanpool Research, summarizes the university-based vanpool research that has been identified. The intent is more to identify "pointers" rather than to comprehensively summarize research findings.
NTIS No. PB 80-119613 Price A06

PLANNING, POLICY AND PROGRAM DEVELOPMENT

Transit Network Analysis: INET
Final Report
R. B. Dial, et al., G. S. Rutherford and Associates. UMTA-UPM-20-79-3, July 1979, 360p
This report is a collection of five independently developed documents concerning the transit system analysis program: INET (Integrated Transit Network). INET, a new computer program which is an integral part of UTPS (Urban Transportation Planning System), has been developed to aid planners in the analysis of urban transit systems. INET makes transit network coding quick and easy by exploiting data already available for highway networks. It maintains consistency between transit and highway levels of service, and it helps bridge the gap between transit planning and operations. Experience with actual highway and transit data has shown that INET performs with speed and accuracy even better than expected. INET is a substantial improvement over previous transit network programs and greatly facilitates transit systems analysis.
NTIS No. PB 80-141807 Price A16

SOCIOECONOMICS

Mass Transit Metrication: A Recommended Policy and Metric Conversion Plan for UMTA
Technical Report
Automated Management Systems, Inc. UMTA-IT-06-0209-79-1, July 1979, 130p
This study was undertaken in order to develop for the Urban Mass Transportation Administration (UMTA) a recommended policy and comprehensive plan for the orderly conversion to the uses of the International System of Units, or the metric

system. However, metrication does not occur unilaterally, and a plan cannot be drawn for one agency alone. Metrication and its planning must involve all organizations likely to be impacted, including other government agencies and manufacturers of the products in the industry. In this context, the mass transit industry includes both management and labor interest in the areas of buses and urban rail manufacture. This report suggests some actions which the Urban Mass Transportation Administration, the American Public Transit Association, and the Department of Transportation can take to best fill the perceived needs of members of the mass transit industry, and at the same time, use the proven techniques learned by those who have successfully converted to the metric system. In particular, this report recommends the use of metric units on new designs based on the Cumulative Cost approach.

NTIS No. PB 80-125008 Price A07

TECHNOLOGY DEVELOPMENT AND DEPLOYMENT

Assessment of the Busch Gardens Automated Anheuser-Busch Shuttle System
Final Report

H. A. Theumer and C. P. Elms, N. D. Lea and Associates, Inc. UMTA-IT-06-0188-79-4, November 1979, 166p

This report describes an independent assessment of the operation of the shuttle system at the Busch Gardens theme park in Williamsburg, Virginia, which has been in operation since 1975, and is part of the ride system in the park. The system connects two stations, the Garden Station at the theme park, and the Hospitality Center at the brewery. It is a single lane loop with one two-car train which stops on-line at each station, and is capable of operating in either the clockwise or counterclockwise direction. The information and data presented in this report were collected through surveys of literature, site visits, a visit to the manufacturer, and interviews with site and manufacturer's personnel. The report presents a description of the technical subsystems, as well as a review of performance, reliability, and maintainability. Where important, the review of technical subsystems includes applicability and modifications and/or improvements for application in an urban environment.

NTIS No. PB 80-127384 Price A08

Assessment of the Mueller Aerobus System: The System Installed and Operated for the Bundesgartenschau 1975. Mannheim, Germany
Final Report

W. Bamberg, et al., N. D. Lea and Associates, Inc. UMTA-IT-06-0189-79-2, September 1979, 262p

This report presents the results of an assessment of the Mueller Aerobus System as it was installed and operated for the Bundesgartenschau 1975 (Federal Garden Show 1975) in Mannheim, Germany. This was the first application of this new transportation system based on cableway technology. It provided dual direction as well as scheduled passenger service between two distant points of the Garden Show, from April 18, 1975 to October 19, 1975. The report findings are based on literature searches, system documentation, analysis of system records, and observations and interviews during site visits. This report provides factual engineering information concerning the technical subsystems. System operational performance, system assurance, human interface, and safety and security were assessed. An evaluation of the distribution of capital and operating and maintenance costs, unit costs of service, and equivalent costs is presented. System development and implementation history are also summarized.

NTIS No. PB 80-130636 Price A12

Computer Dial-A-Ride Computer Software and Documentation Tape

U.S. Department of Transportation/Urban Mass Transportation Administration. UMTA-DC-06-0141-77-0, Undated and unpaged

Computer Dial-A-Ride (DAR), a demand-responsive transit system, is a system of computer programs that automates the operation of a personalized transportation service, which is a service that provides on request, a shared-ride from any location within a community to another. DAR is a research and development program sponsored by the Urban Mass Transportation Administration, performed by ADP Network Services, and in collaboration with the Massachusetts Institute of Technology (MIT). The project was instituted in February 1972 in Haddonfield, New Jersey. Since 1975, this computer system (referenced on this tape), has been tested and operational in Rochester, New York, with guidance and project management from MIT, Department of Civil Engineering. The software was developed from the experience gained in the Haddonfield demonstration. The system consists of a real-time program that controls all aspects of operating the transportation service and various support programs used for file maintenance and statistical analyses.

NTIS No. PB 80-115736 Price T12

Computer Dial-A-Ride Software Installation Guide Volume I

Stephen H. Harper and Lynn Hughes-Caley, ADP Network Services. UMTA-DC-06-0141-77-1, January 1978, 65p

Since 1975, this computer system, which is referenced within this report, has been tested and operational in Rochester, New York, with guidance and project management provided by the Massachusetts Institute of Technology (MIT), Department of Civil Engineering. The software was developed from the experience gained in the Haddonfield, New Jersey demonstration. The system consists of a real-time program that controls all aspects of operating the transportation service and various support programs used for file maintenance and statistical analyses. This report includes a complete list and description of other documents available concerning the real-time program and the support programs comprising the Computer DAR system.

NTIS No. PB 80-115744 Price A04

Computer Dial-A-Ride Operator's Handbook and Reference Manual Volume II

Stephen H. Harper and Lynn Hughes-Caley, ADP Network Services. UMTA-DC-06-0141-77-2, January 1978, 350p

This document is a complete guide to operating the real-time DAR program. The manual is intended as a general-use document and is not specific to the Rochester demonstration.

NTIS No. PB 80-115751 Price A15

Computer Dial-A-Ride Street Name File Building System Volume III

Stephen H. Harper, ADP Network Services. UMTA-DC-06-0141-77-3, January 1978, 87p

This report addresses the street name file system that the real-time program uses for translating addresses to a set of coordinates and zones. Most data necessary to build the street name files originates with the Census Dime Files. This document supplies user documentation and a functional description of the

software provided for building files of the street name file system. Detailed information for executing each of the steps of the building process is given in addition to message descriptions, input data file descriptions and sample values, and a description of the structure of each of the files created. A detailed functional description is given of the major data bases and the procedures included in the software.

NTIS No. PB 80-115769 Price A05

Computer Dial-A-Ride Software Design and Functional Description
Volume IV

Stephen H. Harper and Lynn Hughes-Caley, ADP Network Services. UMTA-DC-06-0141-77-4, January 1978, 486p

This document consists of three reports: A Software Design and Functional Description of Dial-A-Ride; Dial-A-Ride Input Parameter Files; and Building, Maintaining, and Listing the Advance Customer File. The first report introduces and briefly discusses the hardware and software comprising the DAR system and the general capabilities of the real-time program. An in-depth functional description is given for each subsystem of the real-time program. The second report contains a detailed description of the real-time program's parameter files' contents and structure, and gives suggested input values suitable for initial program testing purposes. The third report in this document discusses the file structure and programs that create and maintain the Advance Customer File.

NTIS No. PB 80-115777 Price A21

Computer Dial-A-Ride Terminal Handling System
Volume V

ADP Network Services. UMTA-DC-06-0141-77-5, September 1978, 10p

This document describes the Terminal Handling System used by the DAR system on the Interdate 8/32. Each module and common block is described in detail.

NTIS No. PB 80-115785 Price A02

Extruded Tunnel Lining System
Phase I - Conceptual Design and Feasibility Testing
Final Report

Brian J. Doherty, et al., Foster-Miller Associates, Inc. UMTA-MA-06-0100-79-11, September 1979, 202p

The Extruded Tunnel Lining System (ETLS) has been conceived as a means of continuously placing the final concrete tunnel lining directly behind a tunnel boring machine. The system will shorten the time required to excavate and line a tunnel section, eliminate the need for primary supports, and thus significantly reduce the cost of tunnel construction. This report discusses such a tunnel lining system designed specifically for rock tunnel application. The report describes the work completed during the first phase of the program and presents a state-of-the-art review of related construction practices, concrete technology, and tunnel liner design methods. The ETLS conceptual design is described. In addition, the results of a development program carried out to formulate a rapid setting concrete for use with the ETLS and a test program to demonstrate the ability to slipform and place that concrete under pressure in a closed form are presented. The ability to slipform a well consolidated slab of the rapid setting Very High Early Cement (VHEC) was demonstrated. The slipformed concrete gained strength rapidly and was self-supporting approximately one hour after the initial addition of water to the concrete.

NTIS No. PB 80-118011 Price A10

Factors Influencing the Performance of Full Face Hard Rock Tunnel Boring Machines Final Report

Gregory E. Korbin, University of California. UMTA-CA-06-0122-79-1, March 1979, 273p

This report considers the major factors influencing full face hard rock Tunnel Boring Machine (TBM) performance, both in terms of machine boreability (rock-tool interaction) and machine utilization. It is not intended to encompass all aspects of machine performance, but to concentrate on the principle elements affecting penetration rate and tool wear, and their methods of prediction, as well as the geologic factors influencing utilization. Ability to place support and/or reinforcement close to the tunnel face, maintain machine stability, and cope with excessive ground water has a major effect on overall progress. Rock-tool interaction is reviewed to assess the major factors influencing TBM boreability from three separate, although related methods. The laboratory and field studies represent the major source of information from which a fundamental and practical understanding of rock-tool machine interaction has evolved.

NTIS No. PB-80-112378 Price A12

In-Service Performance and Costs of Methods to Control Urban Rail System Noise Final Report

H. J. Saurenman, et al., Wilson, Ihrig and Associates and DeLeuw, Cather and Company. UMTA-MA-06-0099-80-1, December 1979, 135p

This study evaluates the acoustic and economic effectiveness of five methods of controlling wheel/rail noise and vibration on urban rail transit systems, which are rail grinding, wheel truing, resilient wheels, ring-damped wheels, and welded vs. jointed rail. The noise reduction methods were tested under revenue operation conditions on the Market-Frankford Line of the Southeastern Pennsylvania Transit Authority rail transit system. This report summarizes noise, vibration, and cost results and compares the measurement results with similar studies. Tests of the propulsion equipment noise showed that propulsion equipment noise limited the reduction of wheel/rail noise observed in this study. The report presents several conclusions regarding noise and vibration control.

NTIS No. PB 80-129216 Price A07

Innovation in Public Transportation
A Directory of Research, Development and Demonstration Projects

U.S. Department of Transportation/Office of Technology Sharing/Transportation Systems Center. UMTA-MA-06-0086-80-1, FY 1978, 221p

This seventh Annual Directory contains descriptions of current Research, Development and Demonstration (RD&D) projects sponsored and funded by the Urban Mass Transportation Administration (UMTA) of the U.S. Department of Transportation. The intent of this Directory is to make public the information regarding UMTA's RD&D activities and the focus is on activity that took place in FY 1978. All projects described are funded under Sections 6, 9, and 11 of the Urban Mass Transportation Act of 1964, as amended. Section 6 programs relate mainly to technology development and deployment, service and methods demonstrations, and transportation planning and management; Section 9 studies relate to local transportation (Technical Studies) and special planning studies; and Section 11 programs relate mainly to policy development and research (including University Research and Training Grant Programs). The Appendices provide information about Federal research and development in urban mass transportation as well as information regarding mass transportation grants and contracts. Also provided is an index of agencies/contractors, a project index, and a subject index. Other Annual Directories describing UMTA's RD&D projects are:

Research, Development and Demonstration Projects, June 1972 (PB 213-228); Improving Urban Mobility . . ., June 1973 (PB 285-427); Innovation in Public Transportation . . ., June 1974 (PB 285-244); Innovation in Public Transportation . . ., FY 1975 (PB 285-245); Innovation in Public Transportation . . ., FY 1976 (PB 285-246); and Innovation in Public Transportation . . ., FY 1977 (PB 295-536).

NTIS No. PB 80-130818 Price A11

Morgantown People Mover (MPM) Operating, Availability, and Maintenance History October 1976 through June 1978
Final Report

C. W. Watt, U.S. Department of Transportation/Research and Special Programs Administration. UMTA-MA-06-0081-79-2, October 1979, 100p

This report covers the period of operation, dependability, and maintenance history of the Morgantown system (now known as the Morgantown People Mover - MPM) from October 1976 through June 1978. The system shut down for expansion early in July 1978. This report carries on the format and most of the coverage established in the Boeing Aerospace Company report: Morgantown Personal Rapid Transit O & M Phase Availability and Maintenance History, January 1977 (PB 266-994), which covered the period of September 1975 through September 1976. Since the purpose of this report is to document the reliability, availability, and maintenance history of the MPM system, information on the spare parts usage and hardware changes included in the Boeing report is omitted from this report. System performance in general improved greatly during the period discussed in this report. The graphs in the report show that performance varied from month to month, but the trend was upward. Sixty-nine component failure types or other causes accounted for all the downtime recorded during the last year. A complete computer printout of the entire Morgantown data base is found in the Appendix of this report.

NTIS No. PB 80-121460 Price A05

Network Analyses of Advanced Group Rapid Transit Systems

D. L. Kershner, The Johns Hopkins University/Applied Physics Laboratory. UMTA-MD-06-0025-79-2, April 1979, 86p

The Advanced Group Rapid Transit (AGRT) system concept, currently under development by the Urban Mass Transportation Administration (UMTA), is characterized by moderate capacity (12 passenger), computer-controlled vehicles operating by headways as low as 3 seconds over a dedicated network of guideways with off-line stations. This report covers work conducted under the heading of network analyses for UMTA. The purpose of this work is to provde assessments of AGRT in various urban applications to supplement and complement the AGRT program contractors' UDS studies. AGRT is being designed and developed as a system capable of deployment in urban applications ranging from circulation systems to urban regional transportation systems. This report analyzes the operational and performance characteristics of AGRT for moderate-to-large network configurations. Three AGRT network scenarios, ranging in extent from 26 to 187 lane miles of guideway were evaluated. The evaluation of each scenario was performed by a computer network assessment model and includes studies of operating policy parameters, system capacity, life-cycle costs, and service dependability. The flow of vehicles, passenger service, systems costs, and energy utilization characteristics of AGRT were computed and presented for each scenario. Relationships between operating parameter choices and system performance are identified, and the importance of tailoring the operating policy to the network configuration and demand level of the application is demonstrated.

NTIS No. PB 80-112006 Price A05

Operational Concepts and Implementation Techniques for Vehicle-Follower Control of AGT Systems
Final Report

A. J. Pue, et al., The Johns Hopkins University/Applied Physics Laboratory. UMTA-MD-06-0038-79-1, August 1979, 327p

This report presents a new baseline approach for the vehicle-follower for the longitudinal control of Automated Guideway Transit (AGT) vehicles. It is shown that for the short headways (0.5 to 3.0 s) contemplated for such systems, a kinematic constraint on the spacing between vehicles exists during speed transit maneuvers. This constraint is a nonlinear function of the service jerk and acceleration limits imposed on vehicle operation and also on the instantaneous values of the state variables of neighboring vehicles. The constraint is explicitly included in an analytical development of the control law, which is then shown to control statisfactorily vehicles during overtaking maneuvers and merging maneuvers up to full line capacity, and to regulate perturbations about nominal operating conditions. Modification of the kinematic constraint is then shown to generalize the approach to the problem of vehicle egress from an off-line station into main line traffic flow, including gap generation. Minimum required station egresslane lengths are then established as a function of headway. The station egress control is shown to be safe and effective even in the event of off-nominal behavior of vehicles in the main line traffic flow. Finally, the implementation requirements for the control are shown to be best satisfied by a "smart" vehicle control configuration, with state variables for vehicle spacing, velocity, and acceleration transmitted through wayside equipment at intervals of approximately one-fifth operational headway. Other headway-dependent factors determined in the implementation analysis are the permissible time delay for data transmission, the required on-board computation rate, and required levels of digital quantization. Results indicate that the control is compatible with existing microprocessor technology.

NTIS No. PB 80-120207 Price A15

Potential for Standardization in Rail Transit Tunnel Construction
Final Report

Delon Hampton and Terence G. McCusker, Delon Hampton and Associates, Chartered. UMTA-DC-06-0182-79-1, August 1979, 86p

The U.S. Department of Transportation has both funded and performed a broad spectrum of studies in an attempt to provide knowledge by which to substantially reduce the spiraling cost of tunnel construction. This study was conducted to provide detailed characteristics (parameters) of tunnel system components and their interrelationships as they relate to the planning, design, construction, and operational phases of rapid transit systems. The research reported within this report was performed in two phases. Phase I provided a detailed catalogue of the interacting components of the factors shown to have a significant effect on tunnel planning, design, construction, and operation and Phase II consisted of an evaluation of the identified critical tunnel components and parameters to establish specific components and/or parameters which are suitable for standardization and future work needs in the area of tunnel standardization. Based on knowledge gained from this study, and from the literature search of the authors, the savings to be expected from tunnel standardization is approximately two percent of construction costs.

NTIS No. PB 80-108699 Price A05

Proceedings Conference on Construction of Urban Rail Transit Systems: The Challenge of More Cost Effective Construction
Conference Proceedings

Roger W. Dewey, Editor, Pacific Consultants. UMTA-MA-06-0100-79-7, September 1979, 106p

The Conference on Construction of Urban Transit Systems, held on December 7-8, 1978, at Williamsburg, Virginia, was sponsored by the Urban Mass Transportation Administration (UMTA) of the U.S. Department of Transportation to present a number of candidate changes in the UMTA urban rail development process. The goal of the conference was to seek input from the construction community on improving the use of public funds and insight into identifying new ways to control and reduce the cost of construction of urban rail transit systems in the United States. The conference was organized into four sections and addressed the following topics: transportation overview; transit assistance program; technology development and deployment; policy; owners' point of view; designers' point of view; contractors' point of view; insurance and bonding; value engineering; construction management; management research and development review; and test sections. Appendix A in this report contains a list of the names and addresses of the conference attendees.

NTIS No. PB 80-130479 Price A06

Proceedings of the Urban Rail Vehicle Crashworthiness Workshop April 1978

R. J. Madigan and M. M. Chen, Editors, Pacific Consultants. UMTA-MA-06-0025-79-9, October 1979, 272p

The Urban Mass Transportation Administration (UMTA) has been actively engaged in crashworthiness research for urban rail transit cars over the past few years. This document contains the proceedings of the Urban Rail Vehicle Crashworthiness Workshop held at the Transportation Systems Center in Cambridge, Massachusetts, April 13-14, 1978. The workshop brought together researchers, manufacturers, users, and government representatives to exchange information on crashworthiness, both to share knowledge and to provide input as to further research needs.

NTIS No. PB 80-127327 Price A12

A Requirements Analysis Document for Transit Vehicle Wheelchair Lift Devices
Final Report

Mark S. Sanders, Canyon Research Group, Inc. UMTA-CA-06-0101-79-1, June 1978, 87p

The purpose of this document is to provide guidelines for the design and evaluation of wheelchair lift devices for public transit vehicles (buses and light rail vehicles). Included is an analysis of wheelchair and maneuvering dimensions and their impact on both the lift system and transit vehicle design. Much of the content deals with general safety considerations and vehicle interior design which are the same for ramp or lift devices. A total of sixty-three requirements and recommendations are presented within this report covering the design and operation of the lift, the vehicle lift interface, the vehicle interior, and the reliability and maintainability of the system. In addition, the report discusses evaluation parameters needed to assess the cost of public transit lift devices.

NTIS No. PB 80-127038 Price A05

Vehicle Longitudinal Control and Reliability Project
Volume II, Part A: A Review of AGT Longitudinal Control and Measurement Technology
Final Report

E. Petrino, Editor, Otis Elevator Company/Transportation Technology Division.

UMTA-IT-06-0148-79-4, June 1979, 58p

A Review of AGT Longitudinal Control and Measurement Technology assesses the current state- of-the-art of each technology. These two technologies are grouped together because of their strong interdependence. The intent of this review is to provide top level information that can be used by system designers, specification writers, and regional planners. This review is a part of the Vehicle Longitudinal Control and Reliability (VLCR) research project, sponsored by the the Automated Guideway Transit Technology (AGTT) Program of the Urban Mass Transportation Administration. This report discusses theoretical and implemented longitudinal control concepts as they apply to four categories of AGT vehicles: shuttle-loop transit; large and small group rapid transit; and personal rapid transit vehicles. Volume II consists of three other reports: Part B - A Review of AGT Communication System Technology (UMTA-IT-06-0148-79-3); Part C - A Review of AGT Propulsion, Power Conditioning, Braking and Power Distribution Technology (PB 300-373); and Part D - A Review of Entrainment Technology (PB 300-372).

NTIS No. 80-114036 Price A04

Vehicle Longitudinal Control abd Reliability Project
Volume VIII: VLCR Data Base
Final Report

Martine Jeanine Gary, Otis Elevator Company/Transportation Technology Division.
UMTA-IT-06-0148-79-13, September 1979, 217p

This document provides a catalog of the data base material gathered and classified as part of the Vehicle Longitudinal and Reliability (VLCR) Project. The purpose of this effort is to assemble a comprehensive national data base which will help designers or developers, urban planners, program managers, and government officials evaluate and select Automated Guideway Transit (AGT) systems. The VLCR data base incorporates the results of the VLCR project, that is, final contractual deliverables,and illustrated descriptions of domestic and foreign AGT systems, as well as reports describing the procedures and results of the VLCR experimental program. In addition, the data base encompasses a large number of other technical documents dealing with vehicle longitudinal control, command, control, and communication systems, propulsion, braking, reliability, and other related subjects. The basic organization of the VLCR data base catalog consists of two sections: 1) an annotated bibliography and 2) a subject index.

NTIS No. PB 80-132541 Price A10

TRANSPORTATION MANAGEMENT

Handbook for Management Performance Audits
Volume I

George M. Smerk, et al., Indiana University/The Institute for Urban Transportation.
UMTA-IN-11-0004-79-1 , October 1979, 186p

A management performance audit is a comprehensive examination and evaluation of a transit system's goals and objectives and the procedures it uses to accomplish these goals and objectives. The audit takes into account the resources with which the system has to work and the constraints under which it must operate. A management performance audit has two purposes: 1) to improve the efficiency and effectiveness of the system by providing management with information to improve its practices and procedures and 2) to show how well public funds are being used by determining the efficiency of the ope tion. This Handbook introduces the concepts and techniques involved in management performance audits. This volume, Volume I, describes the theory and technique of carrying out

a management performance audit. The history and benefits of the audit are introduced; a description of the characteristics of a transit system including its social, political, and economic environment, its governing body, and its internal functions such as maintenance and transportation are addressed; and a discussion of the auditor's procedures from the planning of the audits to preparing the written report is presented. Volume I also gives background information for using Volume II.

NTIS No. PB 80-117484 Price A09

Handbook for Management Performance Audits
Volume II

George M. Smerk, et al., Indiana University/The Institute for Urban Transportation. UMTA-IN-11-0004-79-2, October 1979, 100p

This volume, Volume II, is a field guide consisting of outlines and questionnaires used in conducting an audit. The outlines and questionnaires are provided for each characteristic of a transit system including its external environment, its governing body, and its internal functions such as maintenance, transportation, accounting, and finance. The outlines give the auditor a guide for collecting data by way of interviewing employees and other individuals involved with the transit system and the questions provide technical detail that an auditor must collect from each functional area.

NTIS No. PB 80-117492 Price A05

Managing SEPTA Strategically
Final Report

Anthony R. Sloan, Southeastern Pennsylvania Transportation Authority. UMTA-PA-09-0005-79-1, September 1979, 227p

The purpose of this report is to present a way of more effectively managing a public transportation authority, specifically, the Southeastern Pennsylvania Transportation Authority (SEPTA), to enable it to better confront the problems and opportunities it is encountering through an approach which combines management-by-objectives with cost-effectiveness analysis. The approach presented is strategic in both method and scope. Its sweep is region-wide and long term, but it also deals with the local and the immediate. In doing so, it serves as a surrogate for the profit motive of private enterprise. A decision process is described, which involves expressing an organization's functions as discrete projects related to a clearly defined set of objectives, and then comparing the projects through cost-effectiveness analysis. The involvement of management, employees and citizens, along with the effect of responsibility and reward on job performance, is discussed. The environment in which SEPTA must function in the years to come is considered by examining a set of possible alternative regional futures, market share, and the land-use public transportation relationship. An attempt is made is compare the performance of a variety of SEPTA modes serving two different density-defined areas. The report presents a goals structure for SEPTA, consistent with this decision and encompassing the regional concerns identified earlier. Using this goals structure, the study tests various sample projects for cost-effectiveness. Throughout this report, an emphasis is placed on reinforcement - the pooling of resources by SEPTA and other parties to achieve mutual objectives.

NTIS No. PB 80-123649 Price A11

Marketing Research Project for the Delaware Authority for Regional Transit Task C (Steps One and Two) of the DART Planning Program Draft Report

Wilmington Metropolitan Area Planning Coordinating Council. UMTA-IT-09-0066-79-1, November 1979, 90p

The DART Planning Program was conceived between February-June of 1976 for the purpose of defining and coordinating future requirements for the Delaware Authority for Regional Transit (DART). The program consists of ten separate tasks (Tasks A through J) and will result in ten separate reports. The intent of the Marketing Research Project (Task C of the DART Planning Program) is to gather the necessary data to determine how DART can best promote their services to the public, as well as to relate the data gathering process and the formats in which that data is available, and the general level of acceptability and implications associated with the data. The object of this data gathering phase was to obtain a one percent sample of the population within the entire New Castle County portion of the Wilmington Urbanized Area, plus selected contiguous areas, and to compare their needs and opinions to those of the general public. Data was gathered through mail-out surveys and on-board bus surveys. Survey data was processed by the College of Urban Affairs and Public Policy/University of Delaware. This processing resulted in numerous formats of data presentation. The report concludes that results of both surveys indicate a high rate of "choice" transit riders; those who have the available income and available automobile to make the trip when the bus option was chosen.

NTIS No. PB 80-112238 Price A05

TRANSPORTATION OF DISADVANTAGED/SPECIAL-USER GROUPS

The Valley Transit District: Specialized Transportation for the Elderly, Handicapped and Low-Income in the Lower Naugatuck Valley, Connecticut Final Report

George Kocur, Cambridge Systematics, Inc. UMTA-CT-06-0003-79-1, February 1979, 310p.

A multifaceted demonstration with special emphasis on service to the elderly and handicapped has been operating in the Lower Naugatuck Valley of Connecticut since January 1973 and operated under demonstration program status until June 1977. The Valley Transit District (VTD) has had a large impact on the mobility of a small portion of the target population, with lesser impacts on the general public. Four types of service are operated by VTD: fixed-route, demand responsive door-to-door, subscription, and contract services. An automated fare collection system using credit cards and monthly billings was used from 1973-1975. Fare subsidization for handicapped and elderly citizens was facilitated by this computerized system which bills sponsoring agencies. The user-side subsidies and monthly billings were continued after 1975 using manual methods. The system operates 10 vehicles daily and the average hourly cost is almost $12.00. VTD has withstood several challenges in regulatory and institutional areas from private bus operators and has expanded services throughout the demonstration.

NTIS No. PB 80-113087 Price A14

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Issue 6

January 1980

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umta abstract update

URBAN MASS TRANSPORTATION ADMINISTRATION

9367

Date March-April 1980

Dear Subscriber:

We have instituted a subject classification scheme for the grouping of the UMTA Abstracts commencing with the January-February 1980 edition. The abstracts have been organized according to the seventeen subject areas listed on page 19 of this issue. In addition, we are now ordering the pages of each bi-monthly issue in numerical sequence and will provide a cumulative index of the abstracts with each semi-annual edition. The subject classification should assist in the organization, indexing, and referencing of the materials and will provide for a faster retrieval of information as well as a clearer view of the research activities within the various facets of mass transportation.

The 1979 edition of the UMTA Abstracts, soon to be published, will be the final annual issuance of UMTA-sponsored research activities. Future editions will encompass not only UMTA-sponsored research, but also research abstracts and resumés of mass transportation activities regardless of source, including international results. A contract is currently being negotiated with the Transportation Research Board (TRB) which will create an Urban Mass Transportation Research Information Service (UMTRIS) as part of the Transportation Research Information Service (TRIS). The publication of cumulative UMTRIS abstracts and resumés as well as other informational brochures and publications will be the responsibility of TRB upon contract award.

Sincerely,

Donald M. Chapman
Chief, Information Services Division
Office of Transportation Management

UMTA ABSTRACTS SUBJECT CLASSIFICATION

01. Conventional Transportation Services

02. Center City/Traffic Restraints

03. Energy and Environment

04. Fares/Pricing and Service Innovations

05. Financing

06. Land Use

07. Non-Urban and Low-Density Area Transportation

08. Paratransit Systems and Services

09. Planning, Policy and Program Development

10. Political Processes and Legal Affairs

11. Safety/Product Qualification and Security

12. Socioeconomics

13. Technology Development and Deployment

    A. Bus and Paratransit Vehicle Technology
    B. Bus and Paratransit Operational Technology
    C. New Systems and Automation
    D. Rapid Rail Vehicles and Systems
    E. Commuter Rail Vehicles and Systems
    F. Light Rail Vehicles and Systems
    G. Construction/Tunneling Technology

14. Transportation of Disadvantaged/Special-User Groups

15. Transportation/Transit Management

16. Transportation Productivity and Efficiency

17. Urban Goods Movement

UMTA-SPONSORED REPORTS AVAILABLE AT THE NATIONAL TECHNICAL INFORMATION SERVICE

01. CONVENTIONAL TRANSPORTATION SERVICES

The Applicability of Non-Standard Buses for Service in the Washington Metropolitan Area. Final Report.

Costinett, P. J., R. M. Stribling, and S. J. Andrle. Alan M. Voorhees & Associates, Inc. UMTA-IT-09-0054-80-1, September 1978, 228p.

A series of demonstration projects, conceptual design and vehicle specification studies led ultimately to the creation of a consortium of ten U.S. transit operators' supporting development of a high capacity articulated bus. This report analyzes the characteristics and requirements of these buses and outlines the plan for their introduction into the Washington Metropolitan Area Transit Authority (WMATA) system. This report is a first step in the implementation process, beyond the actual ordering of the vehicles. It identifies and analyzes the distinguishing characteristics of the articulated vehicle, compared to the standard bus in WMATA's fleet, and relates these to its utilization, maintenance, and servicing. The project was conducted in two distinct parts: 1) development of an implementation program for articulated buses already on order (operation and performance characteristics were analyzed in terms of route selection, maintenance, and servicing facility design and driver training; operational/economic evaluation of alternative routes was conducted; legal/regulatory issues were identified; and a detailed schedule of activities was developed for each WMATA department in preparation for the institution of articulated bus service); and 2) a generalized market research and feasibility study that dealt with the applicability of low-capacity bus service in the WMATA area was conducted. It included an assessment of the current and near-future availability of small buses and recent operating experience. A life-cycle costing evaluation of small buses was performed. Prototypical service analysis was conducted, plus case studies of existing applications in the WMATA area. Definitive guidelines were produced indicating the circumstances under which small bus services could be considered appropriate and recommendations were made for further WMATA activities.

NTIS No. PB 80-143944 Price A11

01. CONVENTIONAL TRANSPORTATION SERVICES

Boston Auto Restricted Zone Demonstration Evaluation Plan. Final Report.

Loudon, W. R., W. M. Pecknold, and C. R. Kern. Cambridge Systematics, Inc., under contract to Transportation Systems Center. UMTA-MA-06-0049-79-4, March 1979, 419p.

The Boston Auto Restricted Zone (ARZ) Demonstration project, to be implemented in September 1978, represents an attempt to rationalize auto, transit, and pedestrian circulation patterns in the CBD of Boston. The demonstration includes auto restricted zones, traffic re-routing, improved bus service, improved sidewalk facilities, additional goods movement and loading areas, and a relocation of taxi stands. The objectives associated with the Boston ARZ project include: increased retail sales, increase transit ridership, increased transit productivity, increased pedestrian activity, and improved environmental quality. This evaluation attempts to assess the extent to which the demonstration achieves said objectives and to translate the results into information useful to other urban areas considering similar projects. The evaluation will be performed with a mix of chronological process descriptions highlighting the legal, administrative, and institutional issues involved, and a rigorous statistical assessment of the demonstration's impacts. Data collection tools and procedures used in the pre-implementation phase are presented (Appendix A).

NTIS No. 80-148463 Price A18

04. FARES/PRICING AND SERVICE INNOVATIONS

Evaluation of Ridership, Revenue and Equity Implications of Distance-Based Fares for Transit Systems: Executive Summary. Final Report.

Ballou, D. P., and L. Mohan. State University of New York, School of Business. UMTA-NY-11-0016-80-1, December 1979, 85p.

The purpose of this project was to develop a micro-simulation model to evaluate the impact of selected distance-based fare policies on various sub-groups of the population in terms of revenue, ridership, and average fare paid in the Albany, New York, Metropolitan Area. Data was obtained from an on-board ridership survey conducted by the local transit agency. This report presents information from that evaluation. It states that a distance-based fare policy merits considerations vis-a-vis the present basically flat fare structure from an equity point of view. The micro-simulation technique was adopted because of the need to capture detail at the level of the individual rider, which will permit subsequent aggregation by any characteristic such as age, sex, and trip purpose, for the equity analysis. An interactive software package has been developed to implement the micro-simulation model. Complete description of the model including software and Albany application can be obtained at the School of Business, State University of New York at Albany.

NTIS No. PB 80-148695 Price A05

Cost-Effectiveness Measures for Transportation Services for the Elderly and the Handicapped. Final Report.

Rosenbloom, Dr. S., A. Pio, and J. F. Hickson. The University of Texas at Austin, Council for Advanced Transportation Studies. UMTA-TX-11-0009-80-1, October 1979, 269p (2 vols).

The purpose of this entire study was to identify the costs of different types of transportation service provision to the elderly and handicapped (E&H) and to develop methods by which transportation planners and social service agencies could evaluate and estimate the costs and effectiveness of such alternatives. The study was designed with two distinct audiences in mind: 1) to provide information on the cost and effectiveness of alternative models of service delivery for use by national and state planners; and 2) to present local planners with easy-to-understand methods to estimate the costs they would incur in providing transportation to their clients and to evaluate both the cost and service features offered by alternative providers for arrangements in their communities. This is the first of the two volumes that comprise the final report of the entire study. This volume was designed with the first audience in mind; it is a comprehensive, comparative evaluation of the costs of alternative service arrangements. This volume consists of three chapters: 1) Chapter One considers how and why costs are measured differently by different analysts and suggests valid ways that public expenses may be calculated and measured; 2) Chapter Two presents a comparative analysis of the costs and service characteristics of a range of transportation providers across the United States; and 3) Chapter Three examines the impact of the provision of specialized transportation services to the transportation handicapped on both the travel behavior of aided travelers and on possibly competitive service providers. The upcoming second volume of this final report is a planning handbook which local social service agencies and transportation planners can use to evaluate and estimate the costs and effectiveness of different alternatives.

NTIS No. PB 80-141880 Price A12

Highway Sketch Planning: CAPM, The Community Aggregate Planning Model (CAPM) - Users' Guide. Final Report.

Ryan, J. M. U. S. Department of Transportation, Federal Highway Administration. UMTA-UPM-20-79-2, April 1979, 146p.

This report is an introduction to the Community Aggregate Planning Model (CAPM), and its potential uses. CAPM has been incorporated as a module of the Urban Transportation Planning System (UTPS) package of computer programs and is a computerized transportation sketch planning model, which permits fast and inexpensive preliminary screening of highway improvement alternatives. It is useful in sketch planning applications such as the analysis of urban development patterns, alternative system investments, air quality, and energy consumption. This report incorporates two documents: the CAPM Users' Guide and the CAPM Program Writeup. Together they provide information about the program's capabilities, limitations, data needs, potential applications, and computer requirements. Both are available on the UTPS tape. Also included in this report are discussions of input requirements and output reports, as well as a number of coding examples that illustrate the use of CAPM in the analysis of various planning problems.

NTIS No. PB 80-131923 Price A07

10. POLITICAL PROCESSES AND LEGAL AFFAIRS

Northeast Labor-Management Conference on Issues in Urban Transit, Glen Cove, New York, April 18-20, 1979.

Stern, J. L., S. Rubenfeld, and B. Dennis. University of Wisconsin - Madison, Industrial Relations Research Institute. UMTA-WI-11-0006-80-1, September 1979, 38p.

This report summarizes the discussions which took place at the April 18-20, 1979, Labor-Management Conference on Issues in Urban Transit at the Harrison Conference Center, Glen Cove, New York. The conference was held as part of an experimental project financed by a grant from UMTA to the University of Wisconsin. Approximately thirty union and management municipal transit representatives from the Northeastern region of the U. S. met together to discuss labor relations problems in the industry. This report summarizes the four topics that were discussed at the conference and that were originally selected by an advisory committee consisting of union and management, namely: new UMTA programs; paratransit; shop floor labor-management relations; and part-time employment. For each topic a summary is provided for the problems cited by participants, the recommendations for solving these problems, and specific suggestions for UMTA policy and program development. This conference report states that the comments received from the participants after the meeting indicated that conferences such as the Glen Cove conference, where labor and management representatives could talk informally, were valuable and commended UMTA for its support of this activity.

NTIS No. PB 80-155526 Price A03

11. SAFETY/PRODUCT QUALIFICATION AND SECURITY

Urban Mass Transit: Crime and Related Problems - A Brief Historical Review (1850-1977) with Annotated Bibliograhy. Research Report.

Wallace, P. S. University of Illinois at Chicago Circle, Department of Criminal Justice. UMTA-UTD-50-79-1, August 1977, 101p.

This report reviews criminal activity involving public transit systems from 1850-1977. It shows that the type of crime evolved from primarily non-violent (pickpocketing) prior to 1930, to violent (assaults-robbery) after 1930. Attempts by transit systems to cope with the problem through legislation, police, public relations, and modern technology are described herein. The problem of transit security issues being confused with transit safety is discussed. In this report, transit security is defined as opposed to transit safety. Recent major studies in transit security have referred to the lack of data in this area. The bibliography presents in one document references to data associated with urban transit security. Bibliographical entries herein are annotated and indexed by author, periodical, subject, title, and foreign references. It is organized into eight parts: 1) Theses and Books; 2) Government Reports; 3) Private Reports; 4) Periodical Articles; 5) Newspaper Articles; 6) Unpublished Papers, Reports, and Speeches; 7) Legislative and Legal Documents; and 8) Suggested Readings. Instructions for obtaining cited items are included. For items not generally available, the author made arrangements with the Northwestern University Transportation Library to obtain copies of cited items and make them available to interested persons through loans or reproductions.

NTIS No. PB 80-140361 Price A06

12. SOCIOECONOMICS

Supplement 1: Summary of Capital and Operations and Maintenance Cost Experience of Automated Guideway Transit Systems Costs and Trends for the Period 1976-1978. Summary Cost Report.

Cooke, F. A. F., et al., T. M. Dooley*, and T.F. Comparato*. N.D. Lea & Associates, Inc., and *DOT Transportation Systems Center Staff. UMTA-IT-06-0188-79-1, October 1979, 60p.

This costs supplement is presented in the form of a series of tables and figures which summarize the data obtained as well as the results of analysis. Comments and explanatory notes relative to tables/figures are made where appropriate. Also included herein is information on operating and maintenance and capital costs for bus and rail transit; it indicates how AGT cost experience compares with the conventional modes. This report summarizes operations and maintenance cost experience for the following AGT systems for the period 1976-1978: 1) Airtrans, Dallas/Fort Worth Airport, Texas; 2) Morgantown People Mover, Morgantown, West Virginia; 3) Satellite Transit System, Seattle-Tacoma International Airport, Washington; 4) Passenger Shuttle System, Tampa International Airport, Florida; and 5) WEDway People Mover System, Disney World, Florida. Capital cost data on these and the following additional systems are also reviewed: 1) People Mover, Atlanta-Hartsfield International Airport, Georgia; 2) Busch Gardens People Mover, Williamsburg, Virginia; 3) Satellite Transit Shuttle, Miami International Airport, Florida; 4) AGT System, Fairlane Town Center, Dearborn, Michigan; and 5) UMI Tourister AGT System, King's Dominion, Ashland, Virginia.

NTIS No. PB 80-146483 Price A04

Roosevelt Island Tramway System Assessment. Final Report.

Bamberg, W., et al. N.D. Lea & Associates, Inc. UMTA-IT-06-0189-79-1, August 1979, 210p.

The Roosevelt Island Tramway serves as an urban transit system in New York City. It is based on conventional cable technology and connects a new urban community on Roosevelt Island in the East River to Manhattan. This system is the first urban transit application based on aerial tramway (cableway) technology and has been in service since May 1976. The goals and objectives of this assessment were to provide information related to: 1) factual engineering and operating data concerning the technology which can be used in the planning/implementing of similar cable systems; 2) descriptive information on system performance, economics, and ergonomics, which can be used in planning for the assessment of the feasibility of subsequent system installations; and 3) design, development, and implementation experience with cable technology, to determine what has been learned and how future urban installations can most effectively be carried out. The report findings are based on literature searches, system documentation, analyses of system records and logs, and observations and interviews during site visits. The authors state that the results of this assessment are exemplary for the performance of an aerial tramway system in an urban environment.

NTIS No. PB 80-129224 Price A10

13B. BUS AND PARATRANSIT OPERATIONAL TECHNOLOGY

Loran Position Determination in an Urban Environment: A Comparison of Three Techniques.

Ludwick, J. S., Jr. The MITRE Corporation, Metrek Division. UMTA-VA-06-0065-79-1, October 1979, 52p.

UMTA and the Transportation Systems Center (TSC) are developing a multi-user Automatic Vehicle Monitoring (AVM) system to be deployed in a demonstration in Los Angeles. In addition to the basic fixed-route location subsystem for buses, signposts will also be installed throughout a portion of the Central Business District (CBD), including the high-rise area, at a density high enough to provide sufficient accuracy for random route vehicles in this area. A number of vehicles will be instrumented with a hybrid location subsystem, including a Loran-C receiver and differential odometer, for operation over the entire 400 sq. miles of the Los Angeles basin. This report documents the evaluation of three commonly used techniques for conversion of Loran time-difference-of-arrival measurements to position estimates. The comparison was designed to determine the superior technique in relation to accuracy, performance, and costs vis-a-vis the other techniques; it also attempts to ascertain which technique might be appropriate for a non-signpost random route application. All techniques gave approximately the same accuracy: mean and 95th percentile errors over a 30 sq. mile area including the CBD were approximately 650 ft. and 1,700 ft. respectively, while for the entire 400 sq. mile area, the figures were approximately 1,500 ft. and 2,800 ft. Plots of the predicted position versus actual position showed the predictions of all three methods at most points to be relatively near each other. Indications are that TD grid warpages in the Los Angeles basin are large enough but not sufficiently regular to be compensated for by standard techniques.

NTIS No. PB 80-143092 Price A04

13C. NEW SYSTEMS AND AUTOMATION

Operations of Automated Guideway Transit Vehicles in Dynamically Reconfigured Trains and Platoons. Volume I: Part I - Applications Analysis, and Part II - Vehicle Dynamics. Final Report.

Shladover, S. Massachusetts Institute of Technology, Department of Mechanical Engineering. UMTA-MA-06-0085-79-2, July 1979, 534p. (2 vols).

This is the first of a two-volume report documenting research completed in the MIT Vehicle Dynamics Laboratory regarding dynamic entrainment and platooning of automated guideway transit (AGT) vehicles. This volume includes a general introduction together with Parts I and II of the study dealing with applications analysis and vehicle dynamics, respectively. Volume II of this final report (MA-06-0085-79-3) deals with system issues and contains the overall conclusions of the study. An extended summary of both volumes is contained in report number MA-06-0085-79-1. This study shows that the passenger capacity of AGT systems may be significantly increased by operating vehicles in dynamically reconfigured trains or platoons. It is estimated that a minimum lane capacity of 5,000 to 10,000 passengers per hour is needed to make single-party AGT economically competitive with buses and that this capacity requires the use of trains. In this report the longitudinal control systems needed to effect dynamic en/extrainment with platoon operations at spacings of 30-60 cm are developed with particular attention to stability, jerk limiting requirements, safety and passenger comfort. The capacity advantage of entraining is demonstrated for a single guideway link and for merge junctions, using Monte Carlo simulation. Variable-slot-length point-

follower control is shown to reduce merge delays and maneuver ramp lengths compared with fixed-slot-length methods. The "zero gap" merge scheme developed here produces dramatic improvements compared with conventional merge strategies. The study suggests that the concepts of dynamic entrainment and platooning deserve more detailed study and testing because of the significant advantages they offer.

NTIS No. PB 80-142862 Price A23

Vehicle Longitudinal Control and Reliability Project.
Part B: A Review of AGT Communication System Technology.
Final Report.

Schumacher, P., editor. Otis Elevator Company. UMTA-IT-06-0148-79-3, July 1979, 28p.

This document presents the findings of a review of AGT Communication System Technology, a part of the Vehicle Longitudinal Control and Reliability Project (VLCR). This report assesses the current state-of-the-art, reviews the communication links used within the longitudinal control loop, and discusses the criteria for establishing data rate and the major aspects of a communication system starting with the transmission media modulation techniques, followed by noise and error considerations. The review concludes with a brief summary of data communication in existing AGT systems. The overall technology review is contained in Volume 2 of the VLCR final report. Volume 2 consists of four separate reports (PB 80-114036, IT-06-0148-79-3, PB 300-373, and PB 300-372). The purpose of these reviews was to assess the current state-of-the-art in the particular technology and to judge the applicability to AGT systems.

NTIS No. PB 80-138142 Price A03

13D. RAPID RAIL VEHICLES AND SYSTEMS

ACT-1 Advanced Concept Train Development Program:
Simulated Demonstration Test Report. Final Report.

Boeing Vertol Company, Surface Transportation Systems. UMTA-IT-06-0026-79-7, March 1979, 39p.

The Simulated Demonstration Test of the Advanced Concept Train (ACT-1) was conducted at the Department of Transportation's Transportation Test Center (TTC), Pueblo, Colorado. The purpose of this test was to demonstrate the operation of a two-car train over a composite five-city demonstration route to evaluate its reliability when subjected to rigors of daily operation. However, the TTC facility power substation was unable to provide sufficient third rail voltage to operate a two-car train throughout the demonstration profile. Therefore the test was conducted using single car operation with an accumulation of 11,034 car miles. The Simulated Revenue Service Demonstration at the TTC consisted of two activities: 1) ACT-1 Operation, and 2) ACT-1 Maintenance. The simulated transit route was laid out on the UMTA Rail Transit Test Track at TTC—this route is a composite of routes in the originally planned demonstration cities. The report concludes that the Simulated Revenue Service testing of the ACT-1 vehicle at the TTC demonstrated that the ACT-1 cars can be operated consistently with moderate maintenance support.

NTIS No. PB 80-155294 Price A03

13D. RAPID RAIL VEHICLES AND SYSTEMS

In-Service Performance and Costs of Methods to Control Urban Rail System Noise. Second Test Series Report. Interim Report.

Saurenman, H. J. Wilson, Ihrig & Associates, and DeLeuw, Cather & Company. UMTA-MA-06-0099-79-4, October 1979, 202p.

This project is designed to provide information on both the long-term and short-term costs and effectiveness of various wheel/rail noise abatement procedures implemented on typical urban rail systems in the United States. The report presents the results of the final four phases of a seven-phase test program to determine the acoustical and economic effectiveness of resilient wheels, damped wheels, wheel truing, and rail grinding for reducing wheel/rail noise on urban rail transit systems. This program consists of a seven-phase series of field tests performed on the Southeastern Pennsylvania Transportation Authority (SEPTA) System's Market Frankford Line, and in-depth interviews with management and operating personnel of the North American steel wheeled rapid transit systems regarding said noise abatement procedures. In-car and wayside noise data on both curved and tangent track are discussed. In addition, the report presents information on ground-borne vibration measurements that were performed at the same time as some of the acoustical tests, and a summary of the results of the propulsion equipment noise level tests. The noise from the propulsion equipment was found to limit the reduction of wheel/rail noise that could be observed in this study.

NTIS No. PB 80-132996 Price A10

Negotiating the Subway by the Elderly and Handicapped: METRO A Case Study. Executive Summary.

Coleman, D. B., and E.S. Graye. Howard University, Urban Systems Engineering. UMTA-DC-11-0006-80-1, September 1979, 11p.

See abstract of the final report (DC-11-0006-80-2).

NTIS No. PB 80-156987 Price A02

Negotiating the Subway by the Elderly and Handicapped: METRO A Case Study. Final Report.

Coleman, D. B., and E. S. Graye. Howard University, Urban Systems Engineering. UMTA-DC-11-0006-80-2, September 1979, 312p.

This final report presents the results of a one year research project designed around a case study of the Washington, D. C., Metropolitan Rapid Rail (METRO). It also reviews the Bay Area Rapid Transit (BART) system and the Toronto, Ontario, subway system in terms of their barrier freeness and accessibility. The research objective was to determine if the METRO subway was indeed usable by the elderly and handicapped (E&H). This determination would reflect upon the sufficiency of the design criteria instituted to insure its accessibility by the E&H. These criteria, available in the regulations of the American National Standards Institute (ANSI), are titled Making Buildings and Facilities Accessible to, and Usable by, the Physically Handicapped (A-117.1). The methodology employed in this research included: a literature review; a sample survey of 123 E&H persons; on-site observations of METRO and other selected subway systems; and open-ended interviews with transit planners, rehabilitation and geriatric professionals, representatives of advocate organizations for the E&H. This research led to the finding that major barriers to the accessibility of METRO by the E&H exist because of the awkward location of some facilities and the

inappropriate or unreliable operation of accessibility equipment. In addition, because of their limited scope, the design criteria by which METRO was constructed were found to be insufficient in guaranteeing the usability of rapid rail systems by this particular group.

NTIS No. PB 80-156995 Price A14

Proceedings of the International Conference on Advanced Propulsion Systems for Urban Rail Vehicles, Wahington, D. C., February 5-6, 1980.

The MITRE Corporation. UMTA-VA-06-0053-80-1, February 1980, 241p.

This conference proceedings report reflects the view that (on the basis of current R&D activities in the area of propulsion system designs) advances in control systems, motor design, thermal control techniques, diagnostics and energy efficient systems are reliable. To emphasize the importance of new technology to the transit field, UMTA undertook the sponsorship of The International Conference on Advanced Propulsion Systems for Urban Rail Vehicles in Washington, D. C., on February 5 and 6, 1980. The conference was structured to serve as a forum for the exchange of information among the various international organizations shaping the future of the industry. This conference report contains the papers prepared by experts around the world--Brazil, Finland, France, Germany, Japan, Sweden, United Kingdom, and the United States. The papers were jointly authored by propulsion equipment manufacturers and transit authority personnel to present both designer and user viewpoints toward the propulsion technology. This approach has emphasized the experience of propulsion equipment in the transit environment and presented its effects on transit system performance.

NTIS No. PB 80-149099 Price A11

Rail Transit Criteria for System Review and Preliminary Design. Final Report.

Hintzman, K. W., et al. California Department of Transportation, Office of Planning and Design. UMTA/CA/PD-78/1 (CA-09-8001), December 1979, 360p.

This report is a manual intended to assist in evaluating rail transit proposals, to provide information for preliminary design of trackways, and to serve as a guide to the acquisition and use of data required for the final design of a specific system. The standards and characteristics of a number of operating and proposed systems were analyzed and organized to produce this manual. The first three chapters describe and contrast light and heavy rail systems, outline the system planning process, and discuss the implications of choices within systems. The chapters also describe vehicle and facility characteristics and requirements that affect trackway location and design. Operational factors and the magnitude and range of major cost elements are also discussed. The last chapter contains principles, conventions, and criteria for trackwork and for the preliminary design of trackways.

NTIS No. PB 80-135312 Price A16

13D. RAPID RAIL VEHICLES AND SYSTEMS

Urban Rapid Rail Vehicle and Systems Program.
Final Report.

Griffin, D. K. Boeing Vertol Company, Surface Transportation Systems Department. UMTA-IT-06-0026-79-8, December 1979, 27p.

This report summarizes the efforts and results of UMTA's Urban Rapid Rail Vehicle and Systems Program. The main objective of the program was to make rapid rail transportation more attractive to the urban traveler by providing existing and proposed transit systems with service that is comfortable, reliable, safe, and as economical as possible. The short-range goal was the demonstration of the state-of-the-art in rapid rail vehicular technology; the long-range goal was the development and demonstration of improved vehicles. The State-of-the Art Car (SOAC), incorporating the latest transit railcar technology, was developed and tested. Two cars fabricated were demonstrated in revenue service on six transit properties. Two Advanced Concept Train (ACT-1) cars were developed, fabricated, and tested through a simulated revenue service demonstration at the DOT Transportation Test Center. Under the Advanced Subsystems Development Program (ASDP), fabrication and developmental testing of the components for the self-synchronous propulsion system, the monomotor truck, and the synchronous brake system were accomplished.

NTIS No. PB 80-155500 Price A03

13G. CONSTRUCTION/TUNNELING TECHNOLOGY

Field Evaluation of Fracture Control in Tunnel Blasting.
Final Report.

McKown, A. F., et al. Haley & Aldrich, Inc., under contract to Transportation Systems Center. UMTA-MA-06-0100-79-14, December 1979, 172p.

The objective of this research was to implement fracture control procedures in a tunnel project and to assess the practicality, advantages, disadvantages, performance and cost effectiveness of fracture control methods against smooth blasting procedures. This report describes the procedures and results of field tests of fracture control. It describes and discusses the project and site geology, the theory applications of fracture control blasting, and the experimental procedures used. The report provides conclusions and recommendations for future research. The procedures and results of an experimental smooth blasting round utilizing milli-second delay detonating caps are described in Appendix A. The results of the test program indicate that, when compared with conventional smooth blasting techniques, fracture control techniques offer the advantages of reduction of number of perimeter holes and amount of explosives used; improved structural integrity of remaining rock; reduction in overbreak; and reduction in vibration levels resulting from perimeter hole detonations. When applied to opening cuts, it was found that fracture control techniques can reduce the number of holes and the amount of explosives as compared with conventional methods, while maintaining equivalent vibration levels and advance. The authors recommend more field testing of these procedures and documentation of blasting design parameters in various rock types, and developing a single pass combination drill bit/notching tool to reduce cost of notching drill holes and make fracture control techniques economically desirable.

NTIS No. PB 80-149297 Price A08

13G. CONSTRUCTION/TUNNELING TECHNOLOGY

Improved Design of Tunnel Supports: Executive Summary. Final Report.

Einstein, H. H., et al. Massachusetts Institute of Technology, under contract to Transportation Systems Center. UMTA-MA-06-0100-79-15, December 1979, 55p.

This report focuses on improvement of design methodologies related to the ground-structure interaction in tunneling. The design methods range from simple analytical and empirical methods to sophisticated finite element technique. The purpose of this report is to provide the tunneling profession with improved practical tools in the technical or design areas. This summary is the first of six publications on the subject. It summarizes improvements in the methodology available to tunnel designers with the objective of reducing the cost of tunnel construction in the United States. This report summarizes each of the following five volumes: 1) Simplified Analysis for Ground-Structure Interaction; 2) Aspects of Yielding in Ground-Structure Interaction; 3) Finite Element Analysis of the Peachtree Center Station in Atlanta; 4) Tunneling Practices in Austria and Germany; and 5) Empirical Methods for Rock Tunneling. These 5 volumes will be published in March 1980.

NTIS No. PB 80-134547 Price A04

14. TRANSPORTATION OF DISADVANTAGED/SPECIAL-USER GROUPS

Cost-Effectiveness Measures for Transportation Services for the Elderly and the Handicapped. Final Report.

Rosenbloom, Dr. S., A. Pio, and J. F. Hickson. The University of Texas at Austin, Council for Advanced Transportation Studies. UMTA-TX-11-0009-80-1, October 1979, 269p (2 vols).

See abstract cited earlier (p. 22, 09).

Negotiating the Subway by the Elderly and Handicapped: METRO A Case Study. Final Report.

Coleman, D. B., and E. S. Graye. Howard University, Urban Systems Engineering. UMTA-DC-11-0006-80-1, September 1979, 312p.

See abstracts cited earlier (pp 27-28, 13D).

Share A Fare: A User-Side Subsidy Transportation Program for Elderly and Handicapped Persons in Kansas City, Missouri. Final Report.

Dorosin, E., and J. Phillips. Crain & Associates, under contract to Transportation Systems Center. UMTA-MA-06-0049-79-11, July 1979, 96p.

The Share A Fare (SAF) program in Kansas City, Missouri, is a user-side subsidy program designed by the City to provide low-cost door-to-door transportation for the City's elderly and handicapped (E&H) citizens. SAF began operation in May 1977 and is totally funded through a 1/2¢ city sales tax designated for transportation purposes. After 20 months of service, SAF has 13,182 enrollees and subsidizes almost 11,000 trips a month. The service is available for any Kansas City resident who is 65 years of age or older or physically disabled. This final report documents the SAF project during its first 20 months of operation. The report describes how the project works and identifies key features and their impacts on program success. Data is presented on project design and planning; operating characteristics; and on the project's impact on service providers, users, and City sponsor. SAF has demonstrated that the City, acting as broker, can effectively coordinate transportation service between users and providers.

NTIS No. PB 80-142193 Price A05

15. TRANSPORTATION/TRANSIT MANAGEMENT

Feasibility of a Complimentary Solution to the Bus Operator Scheduling Problem. Final Report.

Ward, R. E., and P. A. Durant. West Virginia University, Department of Industrial Engineering. UMTA-WV-11-0001-80-1, December 1979, 107p.

This report is concerned primarily with computerized run cutting. It deals specifically with run-cutting in the bus industry, and it builds on and synthesizes experiences already gained in the field. The basic methodology, outlined in this report, was applied to three real-life data sets acquired from three different bus properties; the results are reported herein. The goal of this study is to provide added insight into the methods of using computer based algorithms to solve the original problem (the creation and selection of duties to cover the full day schedule of bus service). This is done by first breaking it down into a series of smaller problems, which are to be focused on a given duty-type, and then to solve the problem of selecting cost effective duties for each duty-type by formulating it as a set-partitioning problem, and applying known techniques for arriving at solutions.

NTIS No. PB 80-138282 Price A06

Northeast Labor-Management Conference on Issues in Urban Transit, Glen Cove, New York, April 18-20, 1979.

Stern, J. L., S. Rubenfeld, and B. Dennis. University of Wisconsin - Madison, Industrial Relations Research Institute. UMTA-WI-11-0006-80-1, September 1979, 38p.

See abstracts cited earlier (p. 23, 10).

Public Transit Risk Management: A Handbook for Public Transit Executives.

Ryland, V. W.. Fred S. James & Co. of Virginia, Inc. UMTA-IT-06-0173-79-1, December 1978, 75p.

Risk management is a systematic approach to the problem of loss. Risk management can show managers how to protect their company's assets and income at the most economical cost over an extended period of time. This handbook introduces risk management to transit professionals and outlines the elements of the risk management concept and process. If the transit system's approach is currently very informal, this handbook can help the system develop a more formal approach for better control. If the system is currently a formal risk management program, the handbook can help it to be reviewed more effectively. Worksheets in the report help transit management evaluate their system's functioning from a risk management view. The appendices provide risk identification checklists for property and operations coverages. The activities and concerns of a loss control program are also presented briefly.

NTIS No. PB 80-145287 Price A04

REPORT AVAILABILITY

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umta abstract

URBAN MASS TRANSPORTATION ADMINISTRATION

9367

Date May-June 1980

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Dear Subscriber:

The reports contained in this Bi-Monthly Abstract are organized according to seventeen subject classification areas, as were the reports in the earlier Bi-Monthly Abstracts this year (January-February 1980 and March-April 1980).

This semi-annual edition also contains a Retrieval Term Index which indexes by subject the reports in this issue as well as those in the earlier issues. The Index directs the user to the appropriate Abstract pages, which are now in numerical sequence, and began with the January-February 1980 issue.

A cumulative Retrieval Term Index will appear at the end of every third issue of future Bi-Monthly Abstracts.

Sincerely,

Donald M. Chapman
Chief, Information Services Division
Office of Transportation Management

UMTA ABSTRACTS SUBJECT CLASSIFICATION

01. Conventional Transportation Services

02. Center City/Traffic Restraints

03. Energy and Environment

04. Fares/Pricing and Service Innovations

05. Financing

06. Land Use

07. Non-Urban and Low-Density Area Transportation

08. Paratransit Systems and Services

09. Planning, Policy and Program Development

10. Political Processes and Legal Affairs

11. Safety/Product Qualification and Security

12. Socioeconomics

13. Technology Development and Deployment

    A. Bus and Paratransit Vehicle Technology
    B. Bus and Paratransit Operational Technology
    C. New Systems and Automation
    D. Rapid Rail Vehicles and Systems
    E. Commuter Rail Vehicles and Systems
    F. Light Rail Vehicles and Systems
    G. Construction/Tunneling Technology

14. Transportation of Disadvantaged/Special-User Groups

15. Transportation/Transit Management

16. Transportation Productivity and Efficiency

17. Urban Goods Movement

05. FINANCING

Allocating Funds Under the California Transportation Development Act. Interim Report.

Conant, J. D. and J. McDonnell. California Department of Transportation, Division of Mass Transportation. UMTA-CA-09-8003-80-1, November 1979, 74p.

The Transportation Development Act (TDA) establishes a local transportation fund from sales tax money returned to the county of source. The fund is controlled by the designating Regional Transportation Planning Agency (RTPA) which determines the accounts "off the top" expenses as well as amounts designated for public transportation service. These RTPAs are established throughout the State and can be councils of government, local transportation commissions, or statutorily created multi-county commissions. This report deals with an analysis of the fund distribution process under the California TDA. The report discusses an analysis of the fund flow process to the RTPAs, lists the State suballocation requirements in greater detail, and contains a survey report on regional suballocation of TDA monies to transit properties. The purpose of this study is to show how transit money is distributed in California, particularly as related to transit performance, what was intended by the legislation, and what were some of the results to date. This report comprises a major section of the research study entitled: "Analysis of Transit Performance Measures (TPMs) as Mechanisms for the Allocation of State Aid to Transit Properties".

NTIS No. PB 80-150121 Price A04

Moving People: The Case for Public Transportation. Final Report.

McKnight, C. and C. Johnson. University of Illinois at Chicago Circle, School of Urban Sciences. UMTA-IL-11-0025-80-1, January 1980, 60p.

While support for public transportation is growing, many people question the large subsidies from Federal and local taxes that have been necessary to maintain and expand transportion systems. This report is a Handbook on public transportation for the general public. The issues that it covers include: transportation planning; transportation costs and financing; user benefits of public transportation; social benefits of public transportation; public perceptions of public transportation; and marketing of public transportation. The purpose of this Handbook is to explain how public transportation is planned, how the individual citizen can make his views heard, why subsidies are necessary, and finally, what is being done to improve public transportation. These issues are explored in a question and answer format and several case studies are included to illustrate complex issues and explore topics in greater detail.

NTIS No. PB 80-182686 Price A04

The UMTA Rail Modernization Program: Evaluation of the Impacts of Section 3 Capital Grants for Rail Rehabilitation and Modernization. Final Report.

Bennett, J. Peat, Marwick, Mitchell & Co. UMTA-IT-06-0118-80-1, May 1979, 282p.

This report is an evaluation of the Urban Mass Transportation Administration grants for the modernization of existing rail systems. The report contains an inventory of rail modernization projects by type; mode (rapid rail, light rail, and commuter rail); and city. Impacts of these funds are analyzed by examining specific projects, which are: 1) replace/modernize Burlington Northern commuter rail rolling stock in Chicago; 2) improve power system for Port Authority Trans-Hudson Corporation in New York; 3) improve rolling stock, way and structure, and station on the Riverside Branch of the Green Line light rail system in Boston; 4) replace SEPTA ex-Penn Central Division commuter rail rolling stock in Philadelphia; and 5) modernize the stations in New York and

Philadelphia. In addition, an evaluation was conducted of the process undertaken by local transit operators to secure rail modernization funds and to select and implement projects. This evaluation reviewed the process of a recipient of UMTA Section 3 funds (NYCTA) compared with the process of a transit authority whose rail modernization program is currently financed independent of UMTA capital grants (PATH). Findings, conclusions, and recommendations resulting from this evaluation of project impacts; the investigation of the process for identifying, funding, and implementing these projects; and the Phase I study of the overall investment program are discussed in this report.

NTIS No. PB 80-178775 Price A13

06. LAND USE

Joint Development: Making the Real Estate–Transit Connection. Final Report.
The Urban Land Institute. UMTA-DC-06-0183-79-1, June 1979, 345p.

Real estate development that is directly related to the location and operation of public transportation station facilities is termed "joint development" (JD) in the transportation planning field. Successful implementation of real estate projects related to transit facilities (or JD) depends upon the agreements and arrangements made among developers, transit authorities, and other public agencies. The purpose of this report is to inform new and potential participants in JD of the financial, legal, organizational, and operational aspects of the deals involved in the implementation of JD projects. Through case studies, this report reviews the planning and deal-making involved in the execution of seven major projects in five cities in the United States and Canada: Boston; Philadelphia; Washington, D.C.; Montreal; and Toronto. The case studies include reactions from developers and transit authorities and recommendations on improvements to the JD process from transit planning and physical design through construction to the operation of the projects. The Executive Summary (DOT-I-79-13) of this report is also available from NTIS.

NTIS No. PB 80-169683 Price A15

Joint Development Report. Final Report
Rice Center. UMTA-TX-11-0006-80-1, June 1979, 175p.

This report is part of a continuing series of reports on the subject of joint development value capture issued by the Rice Center team. Joint development, as considered in this report, refers to coordinated design and construction of transit, parking, commercial, residential, recreational, and other facilities by public and private sectors. Each sector owns and develops a portion of these facilities independently, but through collaboration in the development process. The term "value capture" as used in this report, refers to a subset of joint development activities wherein the public sector receives direct financial benefit from the private urban development, which has come about in part because of public investment in transportation improvements. This report is a status report of joint development activity in cities across the nation, documenting research conducted between July 1976 and June 1979. This document is in three parts. Part One discusses legal, organizational, and procedural issues which were observed in the case study research documented in Part Two. Part Two is a status report of national joint development activities,

current as of May 1979, and includes seven city summaries and 26 project case studies. Part Three presents brief status sheet reports of 29 projects. This report also contains a public/private process chart which illustrates the steps necessary for joint development and an examination of the Transportation Corridor Development Corporation (TCDC).

NTIS No. PB 80-150139 Price A08

08. PARATRANSIT SYSTEMS AND SERVICES

The Knoxville Tennessee Transportation Brokerage Demonstration: An Evaluation. Final Report.

Juster, R. D., J. A. Kruger, and C. F. Ruprecht.

Multisystems, Inc., under contract to Transportation Systems Center. UMTA-TN-06-0006-80-1, August 1979, 286p.

The Knoxville Tennessee Transportation Brokerage Demonstration was conducted from October 1975 through December 1978. In this first metropolitan, multimodal implementation of the brokerage concept, an organization known as the Knoxville Commuter Pool (KCP) attempted to identify and match transportation demand and supply across a variety of users and providers, and to effect legal and regulatory reforms conducive to the improvement of transportation services. Primary emphasis during the demonstration was on serving the commuters and social service agencies. A major aspect of the KCP's commuter-oriented activities was the large scale surveying of employees at their worksites and their subsequent computer matching with buses and with other computers having similar travel patterns. KCP purchased 51 vans and leased them to individual commuters as part of an operational vanpool program designed to encourage the growth of a large private vanpool fleet. This report discusses implementation of the vanpool program and its resulting impact on state regulatory law and vanpool insurance. While this experiment in brokerage had great success in its efforts for institutional changes, its overall impact on travel behavior in the Knoxville area was quite limited. However, through the creation of a mechanism for testing new types of coordinated activities, the brokerage concept appears to offer flexibility for better solutions to transportation problems.

NTIS No. PB 80-169337 Price A13

Santa Monica Mountains Recreational Transit Service. Interim Report

Webb, P. Crain and Associates, under contract to Transportation Systems Center. UMTA-CA-06-0130-80-1, February 1980, 148p.

This is a report on first year operations of a weekend subscription transit service to a recreational area outside a major metropolitan area. In this demonstration, the Southern California Rapid Transit District, in conjunction with the Santa Monica Mountains Comprehensive Planning Commission, tested the feasibility of providing a seasonal recreational transit service from inner city areas of Los Angeles to Malibu Creek State Park and Tapia County Park located in the Santa Monica Mountains 35 miles west of downtown Los Angeles. The service offered access to outdoor recreational opportunities for a large portion of the region's population who are heavily dependent on public transportation. Low cost, guided trips were provided for groups to the two mountain parks in what will soon become a National Recreation Area northwest of the city. The project was intended to measure the demand for such a service and to demonstrate its

economic and operational feasibility. This report contains the following elements: an overview of the objectives, innovations, and key evaluation issues for the demonstration; a site description; an accounting of development and operational aspects of the service; results of the evaluation; and a description of the potential for future service in both Los Angeles and other settings.
NTIS No. PB 80-183056 Price A07

09. PLANNING, POLICY AND PROGRAM DEVELOPMENT

Abstracts for University Research Projects Supplement. Bibliography.
Urban Mass Transportation Administration, University Research and Training Program. UMTA-UPP-30-79-1, December 1979, 80p.
This reference document serves as a guide to 47 research reports generated between February 1978 and December 1979 by UMTA's University Research and Training Grant Program, and is a supplement to the February 1978 edition (PB 278-646). The Grant Program was initiated in 1970 with award of the first grants that were authorized by Section 11 of the Urban Mass Transportation Act of 1964, as amended. The Act reflects UMTA's continuing commitment to the dissemination of information to government, state and local planning bodies, private industry, and the general public. The purpose of this document is to provide a listing of abstracts published since February 1978 for research projects. The reports abstracted in this document are divided into subject categories arranged alphabetically.
NTIS No. PB 80-148547 Price A05

Logit Analysis of Rapid Transit Access Choices. Final Report.
Korf, J. L., M. J. Demetsky, and L. A. Hoel, University of Virginia, School of Engineering and Applied Science. UMTA-VA-11-0005-80-2, June 1979, 173p.
This research study examines the suitability of applying the program ULOGIT of the UTPS Package of Urban Transportation Planning Programs to forecast rapid transit access mode choices, or, application of the logit modeling methodology to develop rapid transit access mode choice models which are transferable among different stations in a system. Available data from the Parkham Express bus service in Richmond, Virginia, the Bay Area Rapid Transit (BART) system, and the Lindenwold Line are used. These data are evaluated so as to provide the needed information for modeling access mode choices, and a survey procedure is designed to obtain complete descriptive information for access mode choice analysis in the future. Strategies and issues associated with logit modeling of submodal choices are examined and a specific modeling approach for this study is selected. This research provides a systematic methodology for analyzing and predicting rapid transit access mode travel behavior.
NTIS No. PB 80-159411 Price A08

Logit Analysis of Rapid Transit Access Choices. Executive Summary. Final Report.
Korf, J. L., M. J. Demetsky, and L. A. Hoel. University of Virginia, School of Engineering and Applied Science. UMTA-VA-11-0005-80-1, June 1979, 8p.
This Executive Summary of the final report presents an overview of the research study that examined the suitability of applying the program ULOGIT of the UTPS Package of Urban Transportation Planning Programs to forecast rapid transit access mode choices. This research provides a systematic methodology for analyzing and predicting rapid transit access mode travel behavior. In addition to model development, this study identifies and clarifies important practical

considerations and issues associated with logit models of rapid transit access mode. The results of this study show that the models for classified station groups have coefficients that differ from each other, and from a model calibrated with data for all stations in a group. It is recommended that future analyses of rapid transit access mode choices should be coordinated by UMTA so that a standard procedure is followed to substantiate general conclusions on intersystem and interstation behavior.

NTIS No. PB 80-159403 Price A02

11. SAFETY/PRODUCT QUALIFICATION AND DEPLOYMENT

Passenger Safety and Convenience Services in Automated Guideway Transit. Volume I: Data Collection, Scenarios, and Evaluation. Final Report.

Dauber, R. L. Vought Corporation, under contract to Transportation Systems Center. UMTA-MA-06-0048-79-4, December 1979, 83p.

The objective of one segment of UMTA's Automated Guideway Transit Technology (AGTT) program, the Systems Safety and Passenger Security (SS&PS) study, is the development of guidelines for the assurance of actual and perceived passenger safety and security in Automated Guideway Transit (AGT) systems. Because AGT systems are essentially unmanned, the possibility exists that passenger problems may go undetected for long periods of time. In conventional transit operations, vehicle operators and station attendents have been assigned secondary roles connected with Passenger Safety and Convenience Services (PS&CS). These same services must be provided on AGT in order to establish passenger acceptance of an unmanned environment and to ensure their safety, comfort, and well being. This report provides information relating to accomodating PS&CS for AGT services. Its intent is not to provide specific guidelines for handling routine passenger services and safety measures. The report discusses: literature and personal interview findings documenting methods and procedures for detecting and resolving PS&CS problems in current transit operations; scenarios depicting potential PS&CS problems applicable to AGT systems; selection of methods and procedures from current practices for detecting and resolving PS&CS problems in AGT; analysis and evaluation of the effectiveness of selected candidate methods and procedures; and recommended methods and procedures for accomodating PS&CS problems in AGT.

NTIS NO. PB 80-167059 PRICE A05

Passenger Safety and Convenience Services in Automated Guideway Transit. Volume II: Guidebook. Final Report.

Dauber, R. L. Vought Corporation, under contract to Transportation Systems Center. UMTA-MA-06-0048-79-5, December 1979, 133p.

In order to achieve the goal of providing Passenger Safety and Convenience Services (PS&CS) in Automated Guideway Transit (AGT) systems, current practices have been reviewed, analyzed, and evaluated for their effectiveness in accomodating these problems in AGT. The practices for providing PS&CS in both conventional and AGT have been assessed as applicable to highly automated transit systems. These guidelines have been developed suggesting methods and procedures to provide these services for AGT systems. The final objective of this guidebook is to provide the most effective methods and procedures for

ensuring passenger safety and convenience services in AGT systems. Its contents provide guidance for AGT system planners, designers, operators, and evaluators in identifying potential problems and assessing proposed methods and procedures.
NTIS No. PB 80-167067 Price A07

12. SOCIOECONOMICS

AGT Aesthetics: A Handbook for Planning & Design of Automated Guideway Transit (AGT) Systems.

Skidmore, Owings and Merrill/Boston, under contract to Cambridge Systematics, Inc. UMTA-IT-06-0165-79-2, February 1980, 114p.

The Urban Mass Transportation Administration (UMTA) is currently engaged in an Automated Guideway Transit (AGT) Socio-Economic Research Program that is designed to comprehensively examine issues associated with the future development and operation of AGT systems. As one part of this research program, UMTA is considering the aesthetic implications of building these systems, and has commissioned this Handbook and sponsored an Aesthetic Workshop, both of which are aimed at identifying potential aesthetic problems and their solutions. By drawing on design experience gained throughout the country on numerous existing and proposed AGT systems, as well as the general literature dealing with aesthetic issues, this Handbook can help assure that proper consideration is given to design issues. The Handbook is designed primarily to provide guidance to architects, engineers, and planners who are concerned with aesthetic problems posed by elevated AGT systems. This Handbook does not provide detailed design standards and criteria to resolve final architectural engineering design issues. However, it will be useful during those later stages of the design process as a reminder of basic aesthetic issues which must be dealt with in the development of an AGT system.
NTIS No. PB 80-173594 Price A06

13. TECHNOLOGY DEVELOPMENT AND DEPLOYMENT

Proceedings of the Third UMTA R&D Priorities Conference, Cambridge, Massachusetts, November 1978. Volume I: Proceedings of General Sessions and Summarized Reports of Workshops.

American Public Transit Association. UMTA-DC-06-0157-79-1, November 1978, 71p.

This is a compilation of material that was presented at the Third Urban Mass Transportation Administration Research and Development Priorities Conference. It contains proceedings of the General Sessions and summarized reports of the eight Workshop Sessions as well as a listing of conference participants. Detailed proceedings of the Workshop Sessions may be found in Volumes II through IX, which consist of eight separately titled volumes: Volume II: Bus and Paratransit Technology Workshops (PB 300-987); Volume III: AGT and Advanced Systems Workshops (PB 300-988); Volume IV: Service and Methods Demonstrations Workshops (PB 300-989); Volume V: UMTA Special Technology

Programs Workshops (PB 300-990); Volume VI: Rail and Construction Technology Workshops (PB 300-991); Volume VII: Transit Management Workshops (PB 300-992); Volume VIII: Access for Elderly and Handicapped Persons Workshops (PB 300-993); and Volume IX: Urban Transportation Planning Workshops (PB 300-994).

NTIS No. PB 80-161532 Price A04

13C. NEW SYSTEMS AND AUTOMATION

Accelerating Walkway System Analysis at Washington National Airport.

Chung, Cady C. The MITRE Corporation, Metrek Division. UMTA-VA-06-0041-79-3, June 1979, 79p.

An Accelerating Walkway System (AWS) is a high cpacity, continuously available mode of public transportion that has the potential of filling the service gap between walking or conventional moving walkways and conventional vehicular transit systems. This study examines the site and passenger demand characteristics at the Washington National Airport and analyzes the physical, service, and economic feasibility of using an AWS to provide a pedestrian connection service between the Metro Rapid Rail Station and the air terminal. An economic feasibility of the AWS was performed that included investigation of the capital cost, operating and maintenance cost, and life cycle cost of five different AWS manufacturers, which are Dunlop, APL, Dean Research, TRAX, and Boeing. This report contains numerous charts illustrating the airport facilities, passenger demand, and the various costs associated with the AWS. Related reports are: "Accelerating Moving Walkway Systems: Market, Attributes and Benefits - Report D" (PB 287-083); "Accelerating Walkway System Times Square-Grand Central Station Analysis" (PB 80-181795); and "Accelerating Moving Walkway Systems: Executive Summary" (PB 290-682)

NTIS No. PB 80-183841 Price A05

Accelerating Walkway System Times Square-Grand Central Station Analysis. Final Report.

Chung, Cady C. The MITRE Corporation, Metrek Division. UMTA-VA-06-0041-78-3, December 1978, 40p.

The purpose of this Times Square-Grand Central Station case study is to analyze and determine the economic feasibility of an Accelerating Walkway System (AWS) in an urban application with a high-passenger demand. It is not the intention of this study to examine the feasibility of replacing the existing rail shuttle with an AWS. The two types of AWSs analyzed were a one-directional reversible linear and a two-directional loop. The study showed that the systems analyzed are capable of carrying the existing high-passenger demand of approximately 6,500 per peak hour and 90,000 per day, and of providing a good level of service. The level of service in terms of total travel time provided by the 732-meter AWS will be similar to that of the existing shuttle system during peak hours and better during off-peak hours. The report points out that a major advantage of the AWS is that it is continuously available and the waiting time is minimized. Total capital and Operating and Maintenance (O&M) costs, total cost per passenger, and total cost per place provided for the potential AWS are summarized in the report.

NTIS No. PB 80-181795 Price A03

AIRTRANS Urban Technology Program, Phase II. Volume 1: Control System Improvements. Final Report.

Beberstein, J. N., J. E. Robison, et al. Vought Corporation. UMTA-TX-06-0020-79-2, October 1979, 63p.

AIRTRANS, an Automated Guideway Transit (AGT) system built by the Vought Corporation, has provided transit service for passengers at the Dallas/Fort Worth Airport since January 1974. This successful deployment of AGT technology prompted the investigation of the extension of the technology. Independent assessments were made by the Transportation Systems Center (TSC) and by Vought to determine what changes or improvements would be required to operate AIRTRANS in an urban application. Volume One describes the control system improvements incorporated in the P40 vehicle and the AIRTRANS supervisory data system software additions for dual block occupancy alarm features and P40 passenger vehicle identity. Under the control system improvements, the objectives have been to continue development of the longitudinal velocity control systems as embodied in a new third generation Vehicle Control and Electronics Unit; implement improved functional design features in the areas of data communications, directional reversability, dual side doors, automatic test and checkout capability, built-in manual control, slip/slide detection, supervisory data system software; and improved entrainment capability. Significant progress in the AIRTRANS control system's area has been demonstrated in simulation, laboratory tests, and guideway evaluation.

NTIS No. PB 80-175193 Price A04

AIRTRANS Urban Technology Program, Phase II. Volume 2: Improved Passenger Communications. Final Report.

Jacobsen, R. S. and C. M. Schultz. Vought Corporation. UMTA-TX-06-0020-79-3, October 1979, 54p.

Volume 2 covers the Improved Passenger Communications Task activities of the Vought Corporation, during Phase II of the AIRTRANS Urban Technology Program (AUTP). The primary objectives of the program were to design, build and demonstrate: 1) an onboard television surveillance system; 2) a programmable audio-announcement unit; 3) a dynamic graphic system; and 4) a time-to-arrival display unit for passenger stations. All of these systems were built and successfully demonstrated as part of the operation of a prototype urban AGT vehicle in the Dallas/Fort Worth AIRTRANS system.

NTIS No. PB 80-175201 Price A04

AIRTRANS Urban Technology Program, Phase II. Volume 3: Vehicle and Wayside Subsystems. Final Report.

Albach, W. C., et al. Vought Corporation. UMTA-TX-06-0020-79-4, October 1979, 123p.

Volume Three describes the results of the vehicle and wayside subsystem task of the AUTP performed under a federal grant from UMTA to the Dallas/Fort Worth Airport Board. Improvements to the AIRTRANS AGT system to achieve reduced maintenance cost, increased reliability, improved energy efficiency, and all-weather capability for urban applications have been evaluated, analyzed, tested and demonstrated to enhance urban suitability. The demonstration was accomplished by fabricating an urban prototype vehicle and placing it in test operation in the AIRTRANS system at the Dallas/Fort Worth Airport. The prototype vehicle improvements were made in the steering, propulsion, power collection, vehicle coupling, pneumatic, air compressor, door actuation, environmental control and suspension subsystems, and in vehicle maintenance

access. System versatility was improved by adding a second set of biparting side doors to permit passenger loadings from either side of the vehicle. In addition to vehicle improvements, simulations have been used to evaluate electrical power system changes and the benefits of operation with three-car consists and higher vehicle speeds.

NTIS No. PB 80-181258 Price A06

AIRTRANS Urban Technology Program, Phase II. Volume 4: Vehicle Fabrication, Tests and Demonstration. Final Report.

Gerald, S. B. Vought Corporation. UMTA-TX-06-0020-79-5, October 1979, 138p.

Volume 4 describes the fabrication, test and demonstration activities of the AUTP. Improvements to the AIRTRANS AGT system in speed, reliability, cost, and all-weather capability for urban applications have been evaluated in AUTP. The primary objective of fabrication was to convert the Phase I test vehicle (T365) into a prototype AGT system suitable for urban application. Vehicle tests were made to evaluate and verify system and subsystem designs. Demonstration and revenue operations were accomplished at the airport. Detailed results of the above activities, conclusions, and implications for urban usage are presented in this report. A separate report of the AUTP program is "Inspect and Repair as Necessary (IRAN) Program" (UMTA-TX-06-0020-79-1).

NTIS NO. PB 80-179062 PRICE A07

AIRTRANS Urban Technology Program, Phase II. Volume 5: Systems Operation. Final Report.

Benjamin, D. E., G. M. Jones, and G. F. Ruprecht. Vought Corporation. UMTA-TX-06-0020-79-6, October 1979, 133p.

Volume 5 describes the systems operation portions of the Phase II AUTP. The objective of this system operation study was to determine the effects of several improvements on AIRTRANS operation. Among the improvements investigated and reported within this report are increased speed, increased system capability, additional bypasses and sidings, additional failure management strategies, and demand mode operation. Much of this analysis was performed using ASIM, which is the AIRTRAN's simulation model. Additional simulation work was performed using Vought's Demand-Responsive Automated Transit Simulation (DRATS) model and the Transportation Systems Center's Discrete Event Simulation Model (DESM). This study has significantly expanded the understanding of the complex interrelations of AIRTRANS and other AGT systems of similar complexity. Several findings are significant and documented in this report.

NTIS No. PB 80-157704 Price A07

AIRTRANS Urban Technology Program, Phase II. Volume 6: Severe Weather. Final Report.

Albach, W. C., R. A. Doores, et al. Vought Corporation. UMTA-TX-06-0020-79-7, October 1979, 170p.

Volume 6 describes the severe weather part of the AUTP. The objective of this task was to identify changes through analysis and test that would allow the AIRTRANS system to be used in urban locales with severe weather environments. These activities included analysis, study, and testing of the vehicle and guideway components and systems which would be exposed to severe weather in urban AGT systems. Many cold and ice tests were performed in the laboratory with components and subsystems installed on test fixtures or on the new vehicle fabricated as a part of the Phase II program. Some items tested satisfactorily, either initially or after changes; others did not. Even though

significant progress has been made toward a severe weather-capable AIRTRANS, more development is recommended.

NTIS No. PB 80-157696 Price A08

AIRTRANS Urban Technology Program: Executive Summary, Phase II. Final Report.

Albach, W. C., et al. Vought Corporation. UMTA-TX-06-0020-79-8, February 1980, 32p.

The AIRTRANS system at the Dallas/Fort Worth Airport, Texas, is representative of Automated Guideway Transit (AGT) as it will likely develop in cities in the United States and around the world. AIRTRANS is composed of 13 single-lane miles of concrete guideway connecting 53 stations in six major terminal and parking areas of the airport. There is a fleet of 68 fully automatic electrically propelled vehicles, 59 of which currently operate over this guideway network. As of December 1979, the system had completed more than 19 million vehicle miles and carried 29 million passengers. The system is operating with a high percentage of availability and degree of passenger acceptance. This report summarizes the AUTP performed under a federal grant from UMTA to the Dallas/Fort Worth Airport Board. Improvements to the AIRTRANS AGT technology in speed, passenger acceptance, cost, reliability, and all-weather capability for urban applications have been made and evaluated during the program.

NTIS No.PB 80-179070 Price A03

AMTV Headway Sensor and Safety Design. Final Report.

Johnston, J. T., M. Nelson, et al. Jet Propulsion Laboratory. UMTA-CA-06-0088-80-1, January 1980, 72p.

Progress on two related aspects of the development of an Automated Mixed Traffic Vehicle (AMTV) is described in this report. The two tasks involve improvements to the headway sensing system, and development of AMTV body design concepts that will minimize the chance of injury to pedestrians or occupants in the unlikely event of a collision. The problem of sensing in turns is explored experimentally and requirements for future turn sensors are discussed. A recommended headway sensor configuration employing multiple source elements in the focal plane of one lens, operating together with a similar detector unit is described. Sensor technology is also explored more generally. Alternative concepts including laser radar, ultrasonic sensing, imaging techniques, and radar are compared to the present proximity sensor approach. This report contains guidelines for front-end body designs. Body design concepts are suggested, and sketches are presented. This report also contains numerous charts illustrating AMTV sensor design, turn and U-turn sensor design, and ultrasonic sensor design, as well as a list of references.

NTIS No. PB 80-179039 Price A04

Assessment of Operational Automated Guideway Systems - AIRTRANS (Phase II). Final Report.

Watt, C. W., D. Elliott, et al. U.S. Department of Transportation, Research and Special Programs Administration and Ministere des Transports, Institut de Recherche des Transports. UMTA-MA-06-0067-79-1, January 1980, 338p.

This assessment was conducted by the Transportation Systems Center, in close collaboration with the Dallas-Fort Worth Regional Airport Board, and with active participation of the French Institut de Recherche des Transport, under a bilateral agreement between the U.S. Department of Transportation and the French government. This study completes the assessment of AIRTRANS, the

automated guideway system located at the Dallas-Fort Worth Airport. The four main areas of coverage are: 1) changes in system configuration including the addition of employee service and the modifications of the failure management and control systems; 2) the availability, reliability, and maintainability history of the system and its components; 3) the operational safety history of the system; and 4) a life cycle cost study of the system. Availability was not defined in the original AIRTRANS specification, and several definitions have been used. The official measure used today shows the system as being over 98 percent available during the 4 1/2 years of its operation. The data analysis gives firm numbers for Mean Times Between Malfunctions (MTBM), counting all events which stopped the system. Data for the six time periods studied showed decreasing delay durations, increasing MTBMs and decreasing maintenance costs. Operational safety has been excellent. Some estimators for capital and O&M costs of new systems similar to AIRTRANS are developed, which should be useful to planners. Systems lessons learned are also addressed in this report.

NTIS No. PB 80-182538 Price A15

Assessment of the Phase I Morgantown People Mover System. Technical Report.

Elms, C., H. Merritt, et al. N. D. Lea and Associates, Inc., in collaboration with SNV Studiengesellschaft Nahverkehr mbH in Hamburg, Germany.

The objectives of this assessment report are: 1) to provide information on the system installation, including engineering and operating data, descriptive information on system performance, economics, public response, and experience with system design, development, and implementation; 2) to evaluate the information in order to assess system and subsystem technical performance, system economics, and overall system performance in meeting transportation requirements; and 3) to report results of the assessment in ways useful for guiding R&D on key problem areas, for planning Automated Guideway Transit (AGT) installation, and for making product improvements in AGT systems. The purpose of this Socio-Economic Research Program is to relate the characteristics of AGT Technology to the needs for improved forms of urban transportation and to determine the social, economic, environmental, and performance factors which affect the usefulness of AGT systems. This assessment describes the installation and operation of Phase I of the Morgantown People Mover System at West Virginia University in Morgantown, West Virginia. A detailed description of the technical subsystems is included as well as a review of performance, reliability, maintainability, and cost. A system implementation history is also provided. Where important, the review of technical subsystems include applicability, modifications, and/or improvements for application in an urban environment.

NTIS No. PB 80-177926 Price A12

Control Law Implementation for Short Headway Vehicle-Follower AGT Systems. Final Report.

Pue, A. J. The Johns Hopkins University, Applied Physics Laboratory. UMTA-MD-06-0038-79-2, October 1979, 181p.

This report examines the implementation of a vehicle-follower control law for short headway Automated Guideway Transit (AGT) systems in terms of required sensor accuracy, controller structure, and data transmission requirements. A non-linear control law designed for these systems provides a baseline to investigate the trade-off involved with implementation at headways of 0.5 and 3.0 s. Sensor accuracy is determined by using a suboptimal Kalman filter design where position and velocity estimates are obtained from noisy position measurements. The rms position noise that allows a controller to maintain the

headway within 2 percent of the nominal value is computed as a function of sample rate and vehicle time constant with worst-case wind disturbance. In this report, controller configurations are recommended for headways of 0.5 and 3.0 s that require an 8 bit uplink word at intervals of 0.1 and 0.5 s, respectively. Accomplishments, recommendations, and areas for further study are also presented.

NTIS No. PB 80-181019 Price A09

Description and Technical Review of the Duke University Automated People/Cargo Transportation System. Final Report.

Theumer, H. A. and C. P. Elms. N. D. Lea and Associates, Inc. UMTA-IT-06-0188-79-2, July 1979, 139p.

This report describes and reviews the installation of the automated people/cargo transportation system at Duke University in Durham, North Carolina. A subsequent report should assess the system after it has been in use for a period of time. The objectives of this study are to: 1) obtain descriptive economic system performance and public response (human factors) information which can be used for planning subsequent AGT system installations; 2) obtain factual engineering and operating data about each AGT system which can be used in planning other AGT systems; and 3) review the design, development, and implementation experiences with each AGT system selected to determine what has been learned and how future urban installations of AGT can be most effectively carried out. This report includes a description of the technical subsystems, as well as the designed operation. Specifications of performance, reliability, and maintainability are reviewed and system development and implementation are summarized. Where important, the review of technical subsystems includes applicability, modifications, and/or improvements for application in an urban environment.

NTIS No. PB 80-159734 Price A07

Description and Technical Review of the Miami International Airport Satellite Transit Shuttle System. Final Report.

Theumer, H. A. and C. P. Elms. N. D. Lea and Associates, Inc. UMTA-IT-06-0188-79-3, September 1979, 115p.

This report describes and reviews the installation of the automated satellite transit shuttle system at Miami International Airport. The system at Miami is presently under construction and targeted for passenger service in the first quarter of 1980. The guideway connects the International Satellite Building with the Main Terminal and will separate passengers who have to pass through Customs and Immigration Service from those who do not. Two 2-vehicle trains can transport up to 16,000 passengers per hour in around-the-clock shuttle service. Although this study has been conducted under the assessments activity of the UMTA AGT New Systems Alternatives Program and because the Miami Airport system is not yet in passenger operation, this report and results is considered to be a preliminary rather than an assessment report. It provides a technical review and an in-depth description of the Miami Airport system in terms of the following: Technical Subsystem Review; System Performance; System Costs; and System Development Process.

NTIS No. PB 80-158892 Price A06

Dual Mode Planning Case Study, Orange County. Volume 1: Executive Summary and Planning Analysis. Final Report.

Costinett, P., W. G. Hansen, and J. O'Doherty. Alan M. Voorhees and Associates, Inc. UMTA-VA-06-0030-80-1, June 1977, 211p.

This volume is one of five which document two separate planning case studies which examine the feasibility of dual mode transit systems in Orange County, California and in Milwaukee, Wisconsin (UMTA-MA-06-0056-80-1 through 80-3). The main objective of this case study was to provide feedback to dual mode system design efforts. This study incorporated a full-fledged technical planning analysis in a real urban area assuming that the required dual mode vehicles and control systems were available. The analysis differed from a conventional planning study, however, in that performance, cost, and demand characteristics are not fixed, but variable. Supply and demand relationships are parameterized so that the impacts of variations in factors, such as access/egress time, guideway speed, headways, fare level, vehicle size, etc., can be determined. A secondary objective of the study was to produce a documented planning methodology in a "how-to" vein which will be transferrable to others. The parametric analysis methodology developed incorporated a simplified demand estimation procedure and a comprehensive cost model for estimating capital, operating, and user time costs in response to incremental parameter variations over user specified ranges. The methodology and results are presented and conclusions are discussed.

NTIS No. PB 80-180516 Price A10

Dual Mode Planning Case Study, Orange County. Volume 2: Methodology. Final Report.

Costinett, P., W. G. Hansen, and J. O'Doherty. Alan M. Voorhees and Associates, Inc. UMTA-VA-06-0030-80-2, June 1977, 381p.

In this report, Volume 2, the methodology and selected results are presented in detail.

NTIS No. PB 80-180524 Price A17

Guidelines for the Maintenance of Downtown People Mover (DPM) Systems. Final Report.

Yen, A. M., F. T. McInerney, and A. E. Hungerbuhler. Technology Research and Analysis Corp. UMTA-VA-06-0055-80-1, July 1979, 95p.

The purpose of this document is to provide Downtown People Mover (DPM) planners with a base whereby they may design their specific systems maintenance program. The DPM Demonstration program is intended to implement completely Automated Transit Systems (AGT) within the cores of major cities. In order to apply AGT maintenance experience to the DPM program, similarities and differences between existing AGT systems and projected DPM systems were investigated, including differences between their equipment and environments. Three AGT systems were considered: the Morgantown People Mover in Morgantown, West Virginia; the Satellite Transit System at Seattle-Tacoma (Sea-Tac) International Airport, and the AIRTRANS system at Dallas-Fort Worth Regional Airport. This report discusses the general maintenance concepts and the applicability of AGT experience to DPMs. It also provides recommended guidelines for the maintenance of DPM systems, as well as summaries of maintenance procedures followed by the three AGT systems that are similar to DPMs in size or environment. The authors state that during start-up of the DPM system, a much higher failure rate than is expected or even tolerable for steady-state operations will be experienced.

NTIS No. PB 80-159361 Price A05

13D. RAPID RAIL VEHICLES AND SYSTEMS

An Investigation of Rail Rapid Transit Carbody Materials. Technical Report.

Morris, R. E., G. Black, and W. Scheirer. The Decision Group. UMTA-IT-06-0175-80-1, March 1980, 143p.

Determination of the behavior of outerskin carbody mterials in transit and passenger inter-city rail service applications is a necessary element of the Rapid Railcar Standardization Program. The specification of structural and outerskin materials for the procurement of new rapid railcars can be an important consideration of transit authorities with demanding operating environments. In the absence of a quantitative basis for carbody material selection, the purchaser has had to rely upon the experience and knowledge of its operating and maintenance personnel and upon information provided by the basic industries. The information contained in this report is intended to assist purchasers of new rapid railcars to determine the degree of compatibility of each carbody material and materials combination with the demands of the purchaser's environment and estimate the relative maintenance costs of owning cars of each carbody material and materials combination.The behavior of the three carbody materials commonly used in the United States, which are aluminum, low alloy high tensile steel, and stainless steel, is examined in this report and compared throughout the range of rapid transit and inter-city passenger rail service applications and operating environments in North America and Europe. Research findings can be summarized as follows: 1) On a discounted present value basis, stainless steel is the preferred material, and while all carbody materials are subject to corrosion and fatigue, the maintenance costs for stainless steel railcars are lower than those for competing materials; 2) Safe cars can be constructed of each of the candidate materials and materials combinations; and 3) Carbody material selection decisions should be made on the basis of the intended service application and operating environment.

NTIS No. PB 80-170970 Price A07

Urban Rapid Rail Vehicle and Systems Program Engineering Test of ACT-1 Vehicle at Transportation Test Center. Final Report.

Boeing Vertol Company, Surface Transportation Systems Department. UMTA-IT-06-0026-79-6, December 1979, 455p.

The objectives of the Advanced Concept Train (ACT-1) Project were to advance the state-of-the-art of rail rapid transit car design and construction and to demonstrate the benefits of advanced technology when applied to rapid transit cars for both existing and future systems. The primary goal was to provide cars that are as comfortable, reliable, safe, and economical as possible, This document contains a description of two ACT vehicles, including major changes incorporated during testing, and the rationale for these changes. The test program is described in detail and results are presented for checkout, adjustment, engineering, and acceptance testing of the ACT vehicles. The test program results in confirmation of significant achievements in vehicle operating efficiency; technology advances in component design and integration; and of considerations for passenger safety, security, and comfort. Additional documents which contain information regarding the Advanced Concept Train are: "ACT-1 Advanced Concept Train Development Program, Phase II: Design, Fabrication, and Functional Test" (UMTA-IT-06-0026-79-5) and "ACT-1 Simulated Demonstration Test Report" (PB 80-155294).

NTIS No. PB 80-155286 Price A20

13G. CONSTRUCTION/TUNNELING TECHNOLOGY

Proceedings Workshop on Tunnel Lining Design, Cambridge, Massachusetts, March 12 & 13, 1979.

Brierly, Gary S., Editor, under contract to Pacific Consultants, with contract administered by Research and Special Projects Administration. UMTA-MA-06-0100-80-2, December 1979, 234p.

This report documents the proceedings of the Workshop on Tunnel Lining Design which was held at the U.S. Department of Transportation's Transportation Systems Center in Cambridge, Massachusetts, on March 12 and 13, 1979. The workshop was sponsored by the Office of Rail and Construction Technology of the Urban Mass Transportation Administration. The workshop provided a forum for the identification and discussion of problems in the design and construction of tunnels centering around six topics: 1) Lining Design; 2) Qualification; 3) Geotechnical Investigations; 4) Observational Approach; 5) Specifications; and 6) Constructibility and Cost Considerations. A position paper on each topic is arranged together with appropriate discussions from the working group members. In addition to background information regarding the planning of this workshop, this report also contains the keynote address, position papers, and names and addresses of subcommittee members, as well as information about the six topics.

NTIS No. PB 80-171366 Price A11

14. TRANSPORTATION OF DISADVANTAGED/SPECIAL-USER GROUPS

The Lift: Special Needs Transportation in Portland, Oregon. Final Report.

Cooper, T. A., Jr., S. Flynn, and P. Bloomfield. Crain and Associates, under contract to Research and Special Programs Administration. UMTA-OR-06-0004-79-1, August 1979, 297p.

The purpose of this UMTA Service and Methods Demonstration was to test a transit operator's ability to provide demand responsive transportation to handicapped and elderly persons and coordinate this service with contracting social service agencies. Project operation and development, costs, impacts, workability, and cost-effectiveness are discussed in this report. The demonstration proved that a transit operator can coordinate with social service agencies to serve their clients and extend coverage to other transportation handicapped persons who did not previously have access to public transportation. In addition, the project had a substantial impact on the travel behavior of regular users and achieved a high penetration of the wheelchair market. However, the Lift operating cost per trip was higher than rates charged by taxis of private-non-profit carriers, and the impact on the total transportation handicapped market of 22,000 persons, was not great. About 6,000 registered, and the majority of registrants did not become regular users because they did not perceive that they needed specialized public transportation. By the time the project ended, the transit operator, Tri-Met, had emerged as the lead special needs transportation agency in Portland, and the Lift

was largely responsible for the agency's leadership role. Significantly, Tri-Met coordination efforts have not yet led to increased efficiency of special needs transportation.

NTIS No. PB 80-177660 Price A13

Planning for the Phase-In of Fixed-Route Accessible Buses. Interim Report No.1: Review of Accessible Transit Services.

Booz, Allen and Hamilton, Inc., Transportation Consulting Division and Synergy Consulting Services. UMTA-IT-09-9010-80-1, January 1980, 287p.

Many transit systems are currently planning to implement accessible buses into their fixed-route operation. This study is being conducted to develop a guidance manual to be used by transit operators and Metropolitan Planning Organizations in planning for the phase-in of fixed-route accessible buses so as to minimize service disruption and maximize mobility benefits. Earlier attempts to satisfy the travel needs of the handicapped centered on specialized transportation services. This document presents a review of the current status of the various planning activities undertaken by the transit systems which are currently operating accessible buses in fixed-route service as well as those which intend to do so in the near future. The six case study systems are: Champaign-Urbana Mass Transit District in Urbana, Illinois; Southern California Rapid Transit District in Los Angeles, California; Milwaukee County Transit System (Milwaukee Transportation Services, Inc.) in Milwaukee, Wisconsin; Bi-State Development Agency in St. Louis, Missouri; Santa Clara County Transit District in San Jose, California; and Washington Metropolitan Area Transit Authority in Washington, D.C.

NTIS No. PB 80-184146 Price A13

15. TRANSPORTATION/TRANSIT MANAGEMENT

Bus Transit Monitoring Study: Interim Report 1, Data Requirements and Collection Techniques.

Flusberg, M., J. Kruger, and J. Curry. Multisystems, Inc. and ATE Management and Service Co., Inc.

In recent years, an interest in revitalizing public transportion has led to an increased awareness of the need to utilize existing resources more efficiently. As a result, the collection of passenger-related transit operations data has received much more attention. Research into the utilization of this data has considerably advanced the state-of-the-art of transit evaluation and has simultaneously, generated considerable controversy regarding its proper role. In many cases, some transit operators have not been able to implement the measures and standards because they have had difficulty in developing a cost-effective system to collect the needed information. The purpose of this study is to develop a comprehensive statistically-based data collection manual that will enable transit operators to collect passenger-related data in a cost-effective manner which maximizes the usefulness of the overall data base. This first interim report presents the results of the first two tasks of the study, which were to identify current data collection techniques and data requirements. These two related tasks were conducted in parallel through three major

activities: 1) a literature review; 2) a review of material collected by the Massachusetts Bay Transportation Authority and the Tidewater Transportation Commission in Norfolk, Virginia; and 3) discussions with 41 transit properties in the United States and Canada.

NTIS No. PB 80-161409 Price A05

Increasing the Productivity of Urban Expressways; Combining TSM Techniques and Transit Improvements. Final Report.

Kain, J. F. and G. R. Fauth. Harvard University, Department of City and Regional Planning. UMTA-MA-11-0031-80-1, October 1979, 95p.

This is the second of a two-part study, which summarizes an analysis of Transportation Systems Management (TSM) and other low capital cost techniques to increase the productivity of urban expressways and streets in dense, built-up areas. Using CORSIM, a variant of the TASSIM land-use transportation model, this analysis examines the benefits and costs of implementing alternative combinations of TSM techniques and transit improvement policies. In Volume I, the costs and benefits of implementing four alternative TSM policies in Boston's central area were estimated. This volume focuses on expressway management policies and transit improvements for Boston's Southeast Corridor. Four TSM techniques: a contra-flow lane for buses; a concurrent-flow lane; ramp metering with bus priority; and automobile tolls, are considered in conjunction with five alternative transit systems offering different combinations of travel times and fares. Of the composite policies tested, expressway ramp metering with an average delay of nine minutes, assuming an improved bus transit system charges $0.7 per mile, is the most feasible cost-effective option. The Executive Summary to this final report is also available from NTIS (PB 80-181076, Price A02).

NTIS No. PB 80-150568 Price A05

Transportation Management Seminar.

The AM&M Consulting Group, Inc. UMTA-VA-09-8004-80-1, Undated, 223p.

This document is is a prototype of a transportation management seminar, which has been prepared and presented by the AM&M Consulting Group, for the Virginia Department of Highways and Transportation. The document covers the introductory lecture, which, in part, comprises the presentation of the discussion moderators of the seminar, introduces the seminar participants, and discusses the concept of the seminar and course curriculum. The report addresses the seminar schedule of topics to be discussed on each of the three days of the seminar, and presents materials to be used within the course.

NTIS No. PB 80-162696 Price A10

Transportation System Management: Prototype Planning Study, Portland. Final Report.

Spanovich,G. Metropolitan Service District (formerly Columbia Region Association of Governments). UMTA-IT-09-0068-79-1, November 1979, 114p.

Transportation System Management (TSM) is a concept that calls for the planning, programming, and implementation of low-capital, short-range improvements designed to increase the efficiency of existing transportation systems. TSM may also serve the goals of energy conservation, environmental protection, and urban revitalization. This report is one of five special studies of the TSM Planning Prototype Studies Program. The program was designed to demonstrate the capabilities of local agencies to undertake TSM planning in a systematic problem oriented manner. The program involved five localities: Portland, Oregon; Dallas/Fort Worth, Texas; Kansas City, Kansas; Seattle, Washington; and Middlesex County, New Jersey. This report documents the

project in Portland and is designed to provide a summary of the procedures utilized in Portland to systematically develop a regionwide program for TSM delineated on a small area basis. The author states that the process described in this report represents a good model for the way in which comprehensive, systematic TSM planning can be carried out. The approach described should be adaptable without major change to other urban areas.

NTIS No. PB 80-181951 Price A06

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